TTP 243 Plus/ 243E Plus/ 342 Plus

THERMAL TRANSFER / DIRECT THERMAL BAR CODE PRINTER

Service Manual

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1. FUNDAMENTALS ABOUT THE SYSTEM

1.1 Features of the TTP-243 Series

1. This bar code printer prints bar codes, characters, logos, on various types of labels and tickets by direct thermal or thermal transfer printing.
2 This printer adopts a “BASIC-like” high level programming language to help users programme the desired label forms with ease.
3. This bar code printer can be connected to a personal computer or an optional LCD keyboard to execute the programs downloaded in the printer’s memory. The printer is equipped with the following standard devices: black mark sensor, peel off module and real time clock.
4. This bar code printer provides a selection of optional features, including cutter module, memory module, portable LCD keyboard, etc.
5. The user friendly labeling software package is bundled with printer.

1.2 Model Naming Syntax

T	T	P	–	2	4	3
		(1)		(2)	(3)	(4)

(1) Print method:
TTP – Thermal Transfer Printing
TDP – Thermal Direct Printing
(2) Resolution of print head (DPI)
(3) Maximum print width (Inch)
(4) Maximum print speed (Inch/Sec)

1.3 Overview

1.3.1 Front View

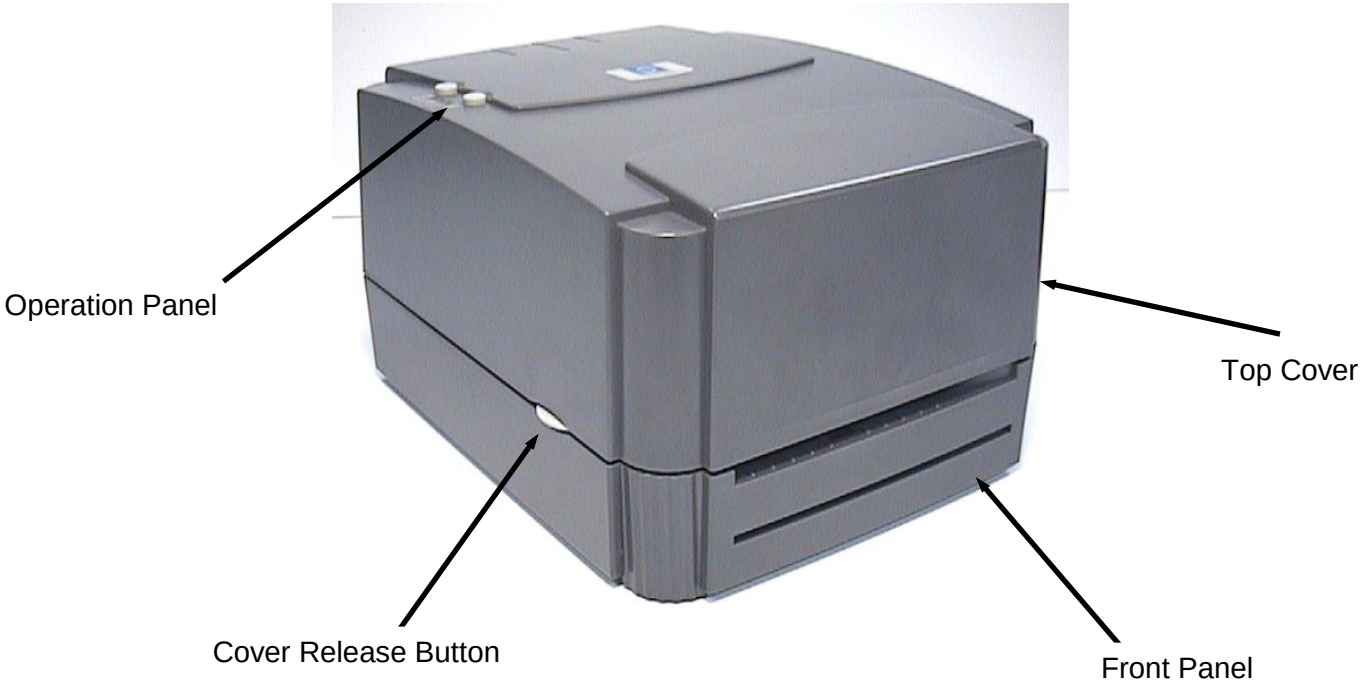


Fig. 1.1 Front View

Note: The one difference between TTP model and TDP model is the ribbon mechanism.

1.3.2 Rear View

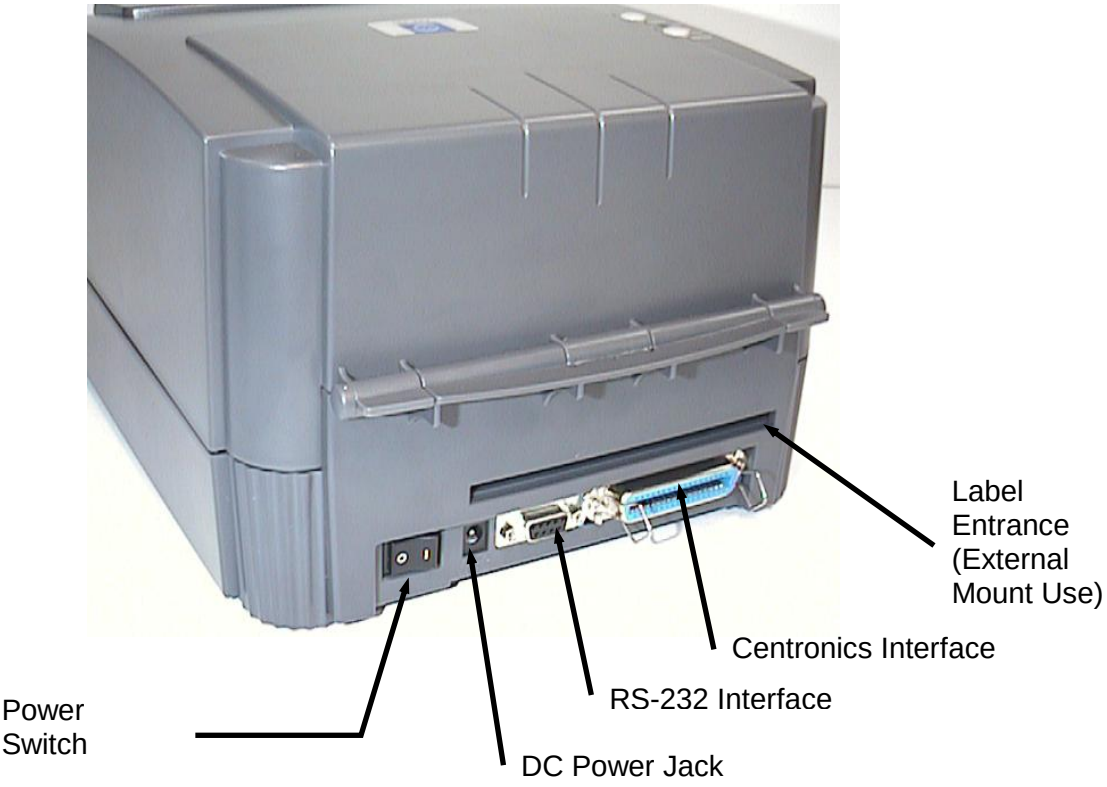


Fig. 1.2 Rear view

1.4 Basic Specifications

- Thermal transfer and direct thermal printing
- High dot density printing (203 dots/inch)
- Selectable print speeds at 1.5", 2.0" or 3.0" per second
- Supports parallel and serial interface
- Maximum media width up to 4.4" (114 mm)
- Adjustable label edge guide
- International character sets
- Print area：TTP-243 Plus/243E Plus：4.09" W x 39" L；TTP-342 Plus：4.09"W x 18"L (without any file downloaded in the printer memory)
- User selectable bar code ratios and heights
- Prints on labels or tickets
- Equipped with black mark sensor
- Equipped with Real Time Clock (243 Plus only)
- Comes with self-peeling function (243 Plus only)
- Buzzer provided to warn of possible errors (243 Plus only)
- Label stock and thermal transfer ribbon are easy to install
- Internal label print counter
- Self test and hex dump mode
- Downloadable fonts from label design software

Electronics/Communication Specifications

- Electrical

CPU: Hitachi SH2 7040

TPH: ROHM 4" KF-2004-GC17B

Stepping Motor: Mitsumi

DC Motor: DC24V

Memory:

—DRAM: 2 Mb

—Flash: 2 Mb

Adapter 100~240VAC±10%, 50~60Hz

Regulations: CE, FCC,TÜV-GS

- Communications Interface:

Serial port: RS-232C (DB-9) at 2400, 4800, 9600 or 19200 baud rate

—Word Length: 7 or 8 data bits, 1 or 2 stop bits, selectable parity

—Handshaking: XON/XOFF and DSR/DTR

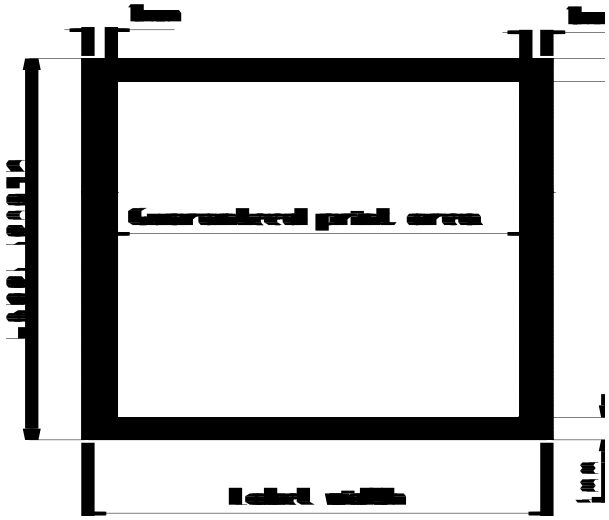
Parallel port: Standard parallel interface

Input Buffer: 60KB

- RS-232 Interface Pin Configuration:

Host Function	9 Pin	25 Pin		9 Pin	Printer Function
				1	+5V
RxD	2	3	←	2	TxD
TxD	3	2	→	3	RxD
DTR	4	20	→	4	DSR
GND	5	7		5	GND
DSR	6	6	→	6	RDY
RTS	7	4	←	7	N/C
CTS	8	5	←	8	RDY
				9	+5V

1.5 Effective Print Area



Label/Ticket Length	12mm~2286mm
Effective Print Length	10mm~2284mm
Label/Ticket Width	25mm~103mm
Effective Print Width	23mm~101mm
No Print Area	1mm

1.6 Available Bar Codes

- Code 39
- Code 93
- Code 128 UCC
- Code 128, Subsets A, B, and C
- Codabar
- Interleaved 2 of 5
- EAN-8, EAN-13, EAN-128
- UPC-A, UPC-E
- EAN and UPC with 2 or 5 digits add-on
- UPC Shipping container code
- Postnet
- Maxicode
- PDF-417
- DataMatrix

1.7 Various Sensors

Feed Gap Sensor

The feed gap sensor detects a label gap to locate the starting print position of the next label. The sensor is mounted 4 mm off the center line of the main mechanism.

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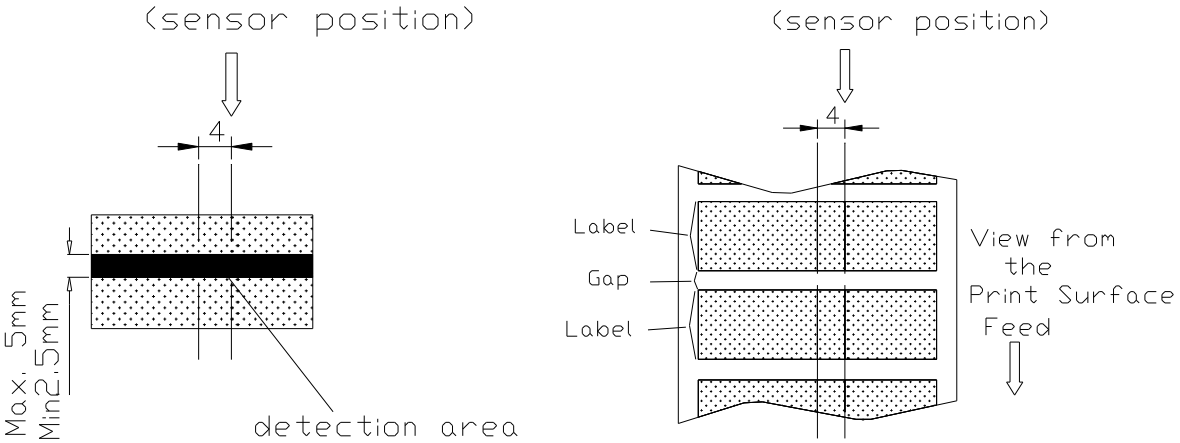
In case of Label

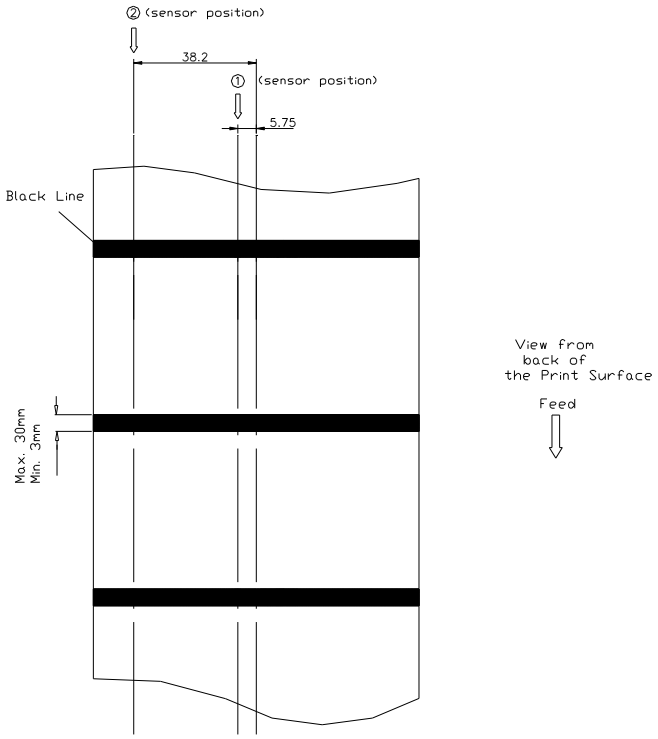


Black Mark Sensor

The black mark sensor locates the position of label by emitting infrared rays onto the black mark at the back of the ticket. The sensor is mounted 5.75 mm off the center line of the ticket roll width on the mechanism.

In case of Ticket

The default sensor position is (1) as shown on the figure below. To change to the (2) position, the customer should notify the manufacturer in advance. There can be only one position for the sensor. Once the sensor position is agreed upon, it can not be changed afterwards.



Ribbon End Sensor

The sensor detects the end portion of the ribbon. The ribbon end must be transparent.

Label End Sensor

The sensor detects the end portion of the label.

Peel off Sensor

The sensor detects the backing paper of a label.

Ribbon encoder

The encoder is used to detect if the ribbon is broken.

2. SUPPLY SPECIFICATIONS

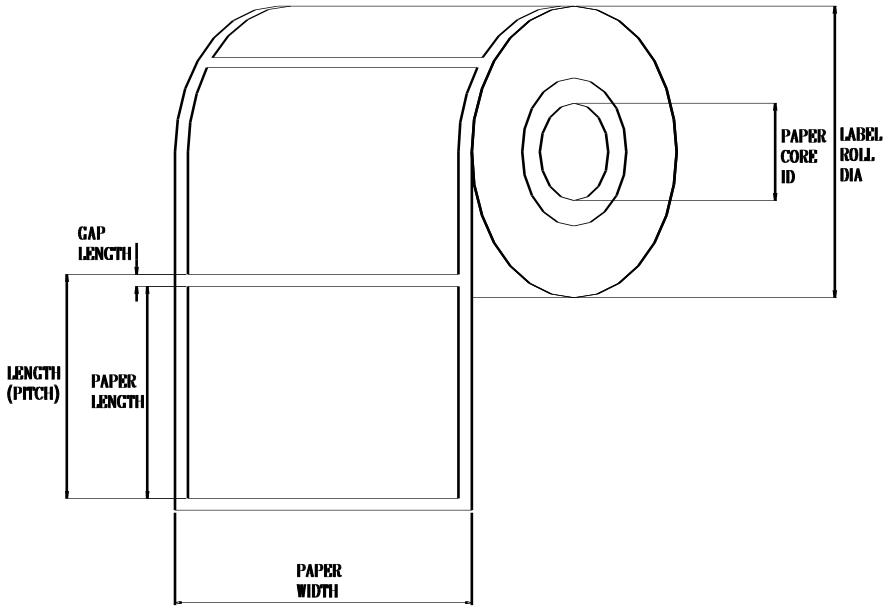
2.1 Types of Paper

Two types of media are available for TTP-243: label and ticket.
In TTP-243, there are two types of sensors for paper: gap sensor and black mark sensor.
Label and ticket can be further classified into direct thermal type or thermal transfer type.

2.2 Specifications

Items	Label
Paper Width	Max.114mm
	Min. 25mm
Length (Pitch)	12～2286mm
Paper Thickness	0.20 mm
Paper Weight	Max 240 g/m^2
Max. Roll Diameter (1" core)	Inner roll diameter. Max 4.3" (110mm) External roll diameter. Max 8.4" (214mm)
Roll Up Method	Print surface wound outside as standard
Paper Core ID.	ϕ25.7±0.3mm

Note:
(1). The width and thickness quoted above are said of the label plus its backing paper.
(2). Likewise, the approval of label entails that of its backing paper.
(3). In the peel off mode, the minimum pitch is 35mm.
(4). In the cutter mode, it is required the paper be wound outside. Otherwise, paper jam tends to result.
(5). In the cutter mode, the paper thickness is 0.2 mm at maximum, and the paper weight is 100 g/m^2 at maximum.
(6). Paper shape is as shown on next page.
(7) Tag is 0.2mm in thickness, and is less than 100g/m^2 in weight.


PAPER
CORE
ID
LABEL
ROLL
DIA
GAP
LENGTH
LENGTH
(PITCH)
PAPER
LENGTH
PAPER
WIDTH

2.3 Ribbon Sizes and Shapes

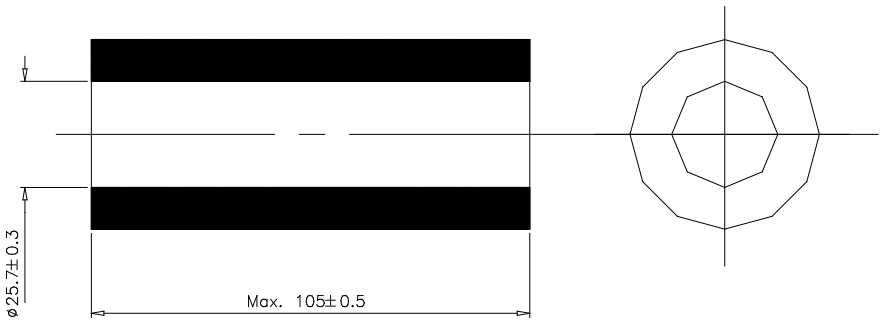
Item	Specifications
Ribbon shape	Spool type
Ribbon width	Max. 110mm
	Min. 40mm
Ribbon winding width	Max. 110mm
	Min. 40mm
Leading tape	Polyester film, 335±5mm long
End tape	Polyester film (transparent), 250±5mm long
Max. ribbon OD.	ϕ67mm
Winding method	Ink surface to be wound outside

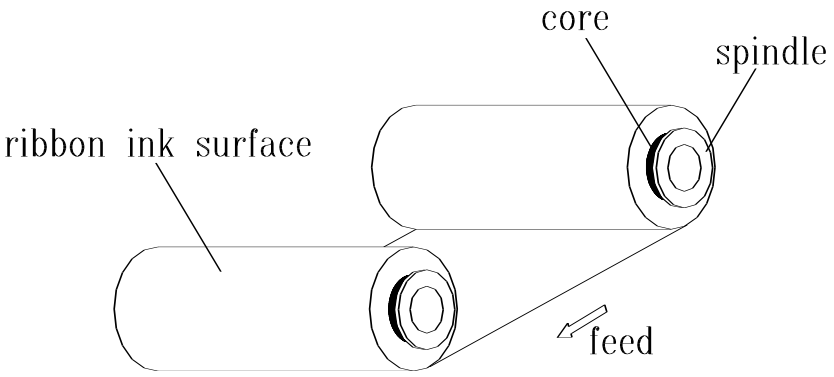
Note: The maximum length of ribbon depends on its thickness and core outside diameter.

The formula below defines the correlation between ribbon roll length and ribbon core diameter.

$L = \frac{(D^2 - d^2) \times \pi}{4t}$, where

L = Ribbon length
D = Max. roll diameter
d = Ribbon core outside diameter
t = Ribbon thickness





3. ELECTRONICS

3.1 Circuit Description

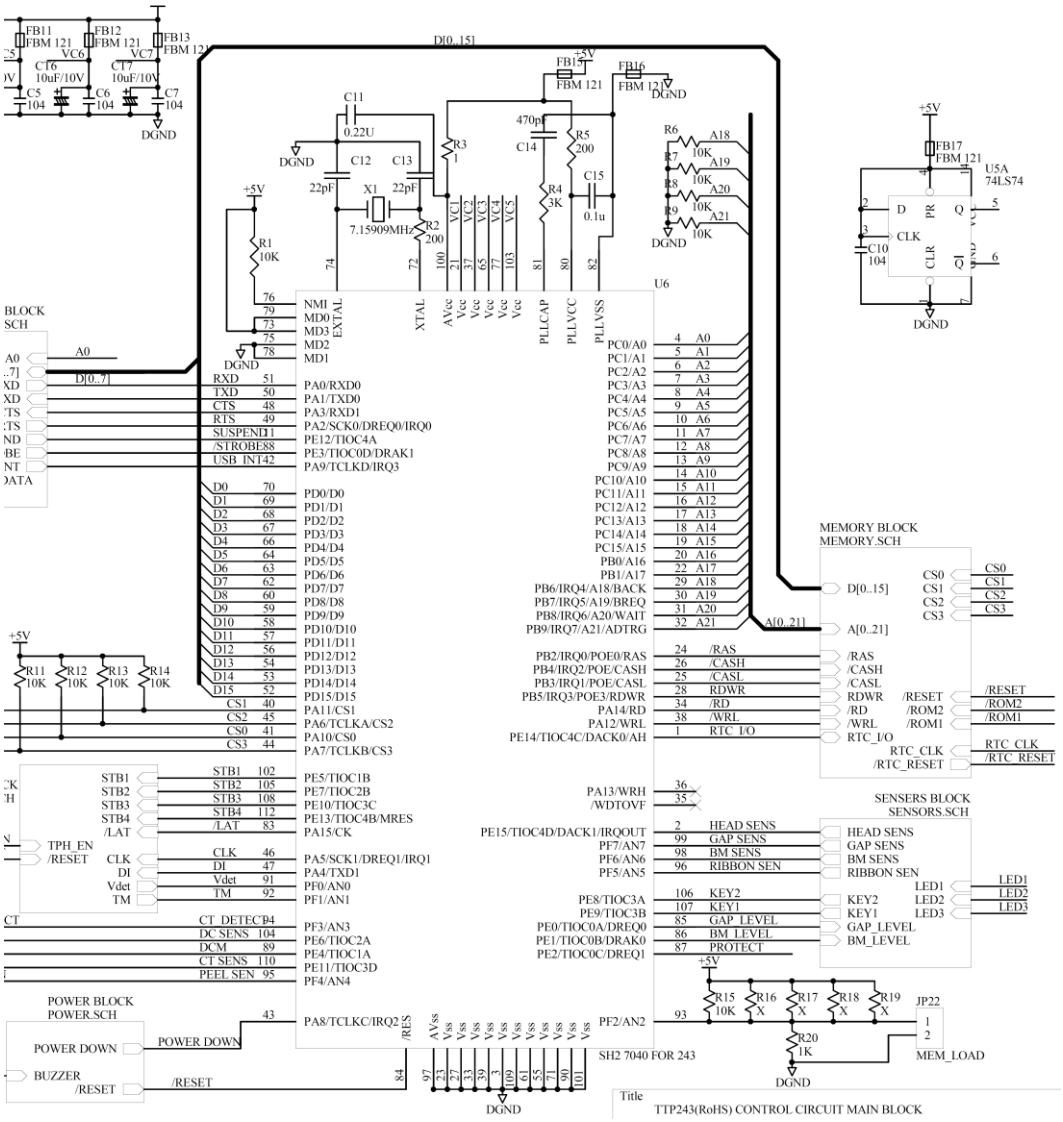


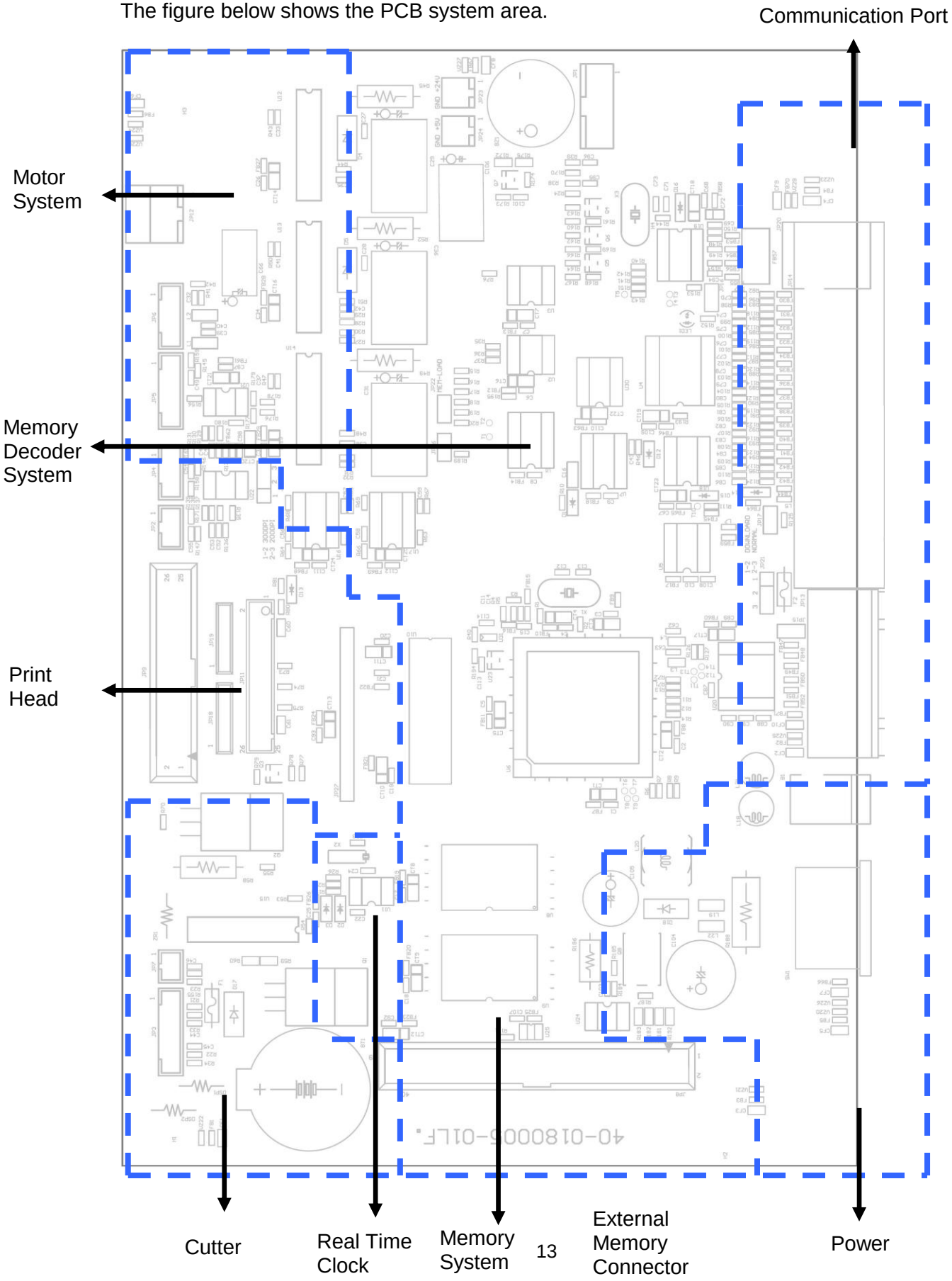
Fig. 3.1 MCU Circuit Diagram

The above is the MCU circuit diagram.

The main board includes seven system blocks:
A: MCU & Decode System
B. Memory System
C. Motor System (stepping motor, DC motor and cutter block)
D. Print head System
E. Communication System (serial & parallel port block)
F. Sensor & Key System

G. Power System

The figure below shows the PCB system area.



3.2 MCU Pin Description

Port	I/O	Initial	High	Low	Function	Instruction
PA0	I	Pull Up			RXD0	RXD for RS232
PA1	O				TXD0	TXD for RS232
PA2	I	Pull Up			PA2	RTS for RS232
PA3	O				PA3	CTS for RS232
PA4	O				TXD1	DI for TPH
PA5	O				SCK1	CLK for TPH
PA6	O	Pull Up		Active	/CS2	/CS2
PA7	O	Pull Up		Active	/CS3	/CS3
PA8	I			Active	IRQ2	Power down
PA9	I	Pull Up		Active	IRQ3	USB_INT
PA10	O	Pull Up		Active	/CS0	/CS0
PA11	O	Pull Up		Active	/CS1	/CS1
PA12	O				/WRL	/WRL
PA13	O				/WRH	No use
PA14	O				/RD	/RD
PA15	O	Pull Up		Enable	PA15	/LAT for TPH
PB0	O				A16	A16
PB1	O				A17	A17
PB2	O				/RAS	/RAS
PB3	O				/CASL	/CASL
PB4	O				/CASH	/CASH
PB5	O				RDWR	RDWR
PB6	O				A18	A18
PB7	O				A19	A19
PB8	O				A20	A20
PB9	O				A21	A21
PC0~PC15	O				A0~A15	A0~A15
PD0~PD15	I/O				D0~D15	D0~D15
PE0	O	PWM	Enable		TIOC0A	GAP LEVEL
PE1	I	Pull Up			PE1	KEY3
PE2	I	Pull Up	Enable		PE2	CASE OPEN
PE3	I	Pull Up		Enable	PE3	/STTOBE for Centronic port
PE4	O	PWM		Enable	TIOC1A	DCM for DC motor enable
PE5	O	Pull Up	Enable		PE5	STB1 for TPH
PE6	I	Pull Up		Enable	PE6	DC SENS for DC sensor
PE7	O	Pull Up	Enable		PE7	STB2 for TPH
PE8	I	Pull Up			PE8	KEY2
PE9	I	Pull Up			PE9	KEY1
PE10	O	Pull Up	Enable		PE10	STB3 for TPH
PE11	I	Pull Up		Enable	PE11	CT SENS for cutter sensor
PE12	I/O	Pull Up			PE12	SUSPEND for USB
PE13	O	Pull Up	Enable		PE13	STB4 for TPH
PE14	I/O				PE14	RTC I/O
PE15	I	Pull Up	Enable		PE15	HEAD SENS
PF0	I				PF0	Vdet for TPH Voltage detect
PF1	I				PF1	TM for TPH temperture

PF2	I			Enable	PF2	MEM load & Hardware version
PF3	I				PF3	CT DETECT
PF4	I				PF4	PEEL SENS
PF5	I				PF5	RIBBON SENS
PF6	I				PF6	BM SENS
PF7	I				PF7	GAP SENS
NMI	I	Pull Up			NMI	No use
/RESETP	I	Pull Up		Active	/RESETP	/RESET
/WDTOVF	O				/WDTOVF	No use

IRQ0: NO USE
IRQ1: NO USE
IRQ2: POWER DOWN
IRQ3: USB_INT
IRQ4: NO USE
IRQ5: NO USE
IRQ6: NO USE
IRQ7: NO USE

Other define

1. System Crystal is 16 MHz.
2. USB Crystal is 48MHz.
3. RTC Crystal 32.768KHz.
4. MCU mode is mode 1.(16-bit space) (MD0 is high, MD1 is low.)
5. Clock mode is PLL ON x 4. (MD2 is low, MD3 is High.)

3.3 Reset Circuit

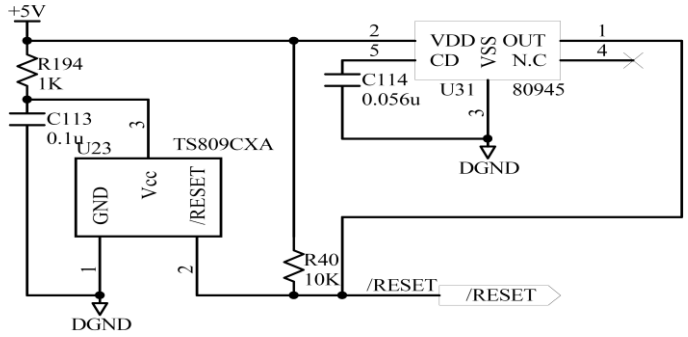


Fig. 3.3 Reset Circuit

This is the reset circuit .The TS809CXA IC outputs the system reset signal of “LOW” when the driving voltage is lower than 4.63V (Typical),U31 NO use.

3.4 Memory System

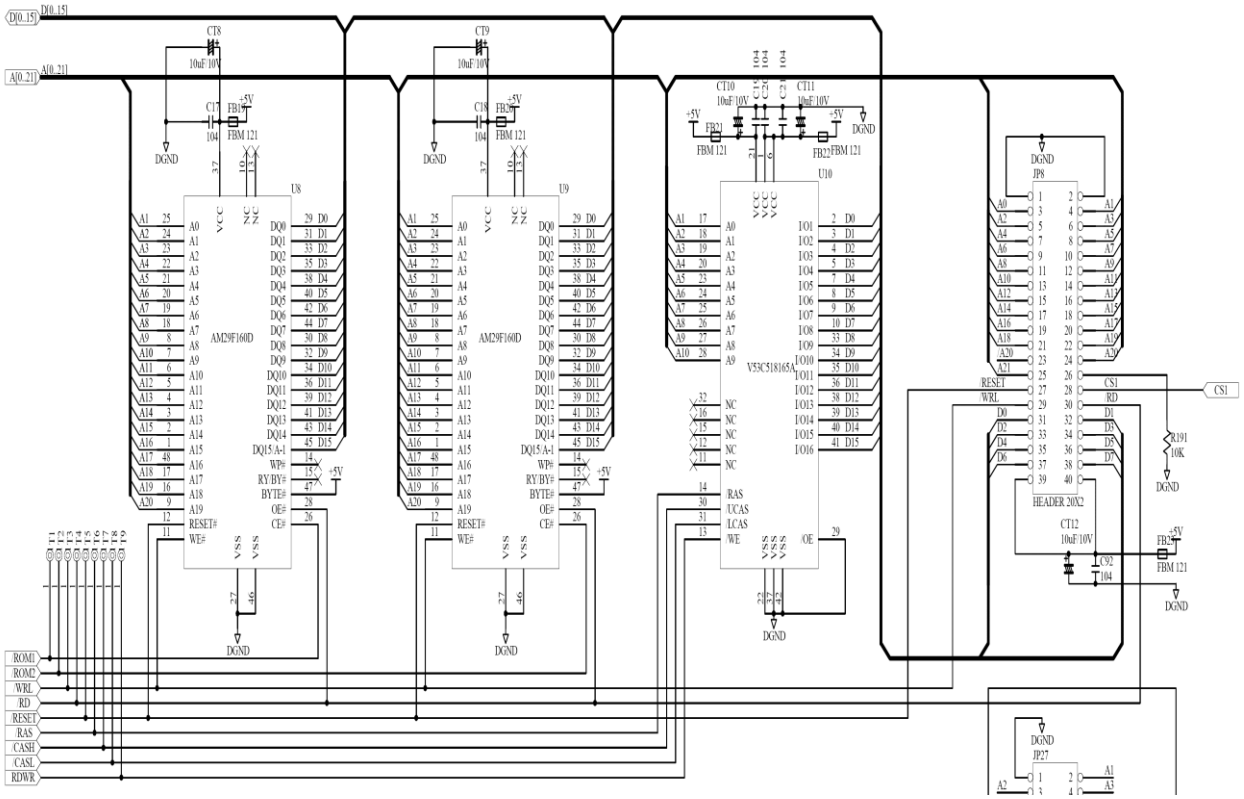


Fig. 3.4 FLASH ROMS and DRAM Diagram

This is the memory circuit. The U8 & U9 are 2M Byte FLASH ROM and U10 is 2M Byte DRAM .

3.5 Sensor&Key

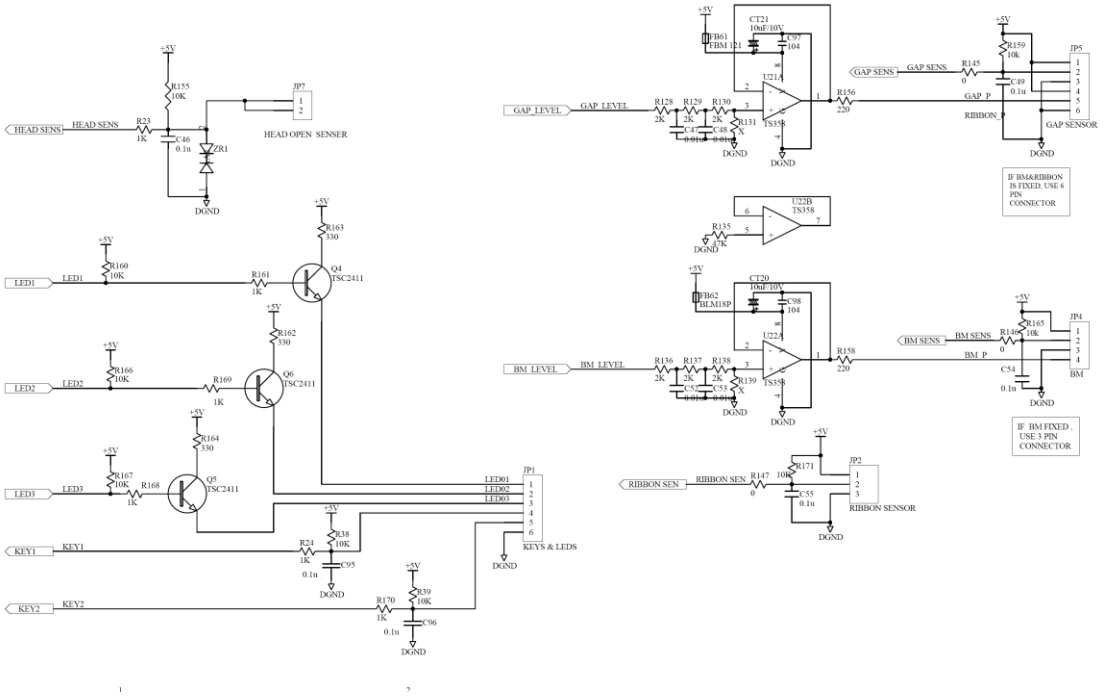


Fig. 3.5 Sensor&Key

JP1 is the connector which connects to the LEDs and Keys. The signal of LED is High when the LED is bright; otherwise, it is low.

JP2 is the connector of the head open sensor. The Head open sensor is a micro switch. the voltage is High when the print head open; otherwise, it is low.
The signal of the key is “LOW” when the keys is press; otherwise, t is “HIGH”.

P4 is the connector which connects to the block mark sensor.
The block mark sensor is a reflect in sensor. the block mark sensor signal voltage is “HIGH “ when the block mark is detected; otherwise, it is “LOW”.

JP5 is the connector which connects to the gap sensor and the gap emitter level. The gap level is a emitter source intensity control signal. signal. The gap sensor is a penetrable sensor. the gap sensor signal voltage is low when the gap is detected; otherwise, it is high.

JP7 is the connector of the HEAD-OPEN sensor. When the printhead open,
The HEAD SENS signal is “High” ; When the printhead close, The HEAD SENS Signal is ”LOW”.

3.6 Real-Time Clock Circuit

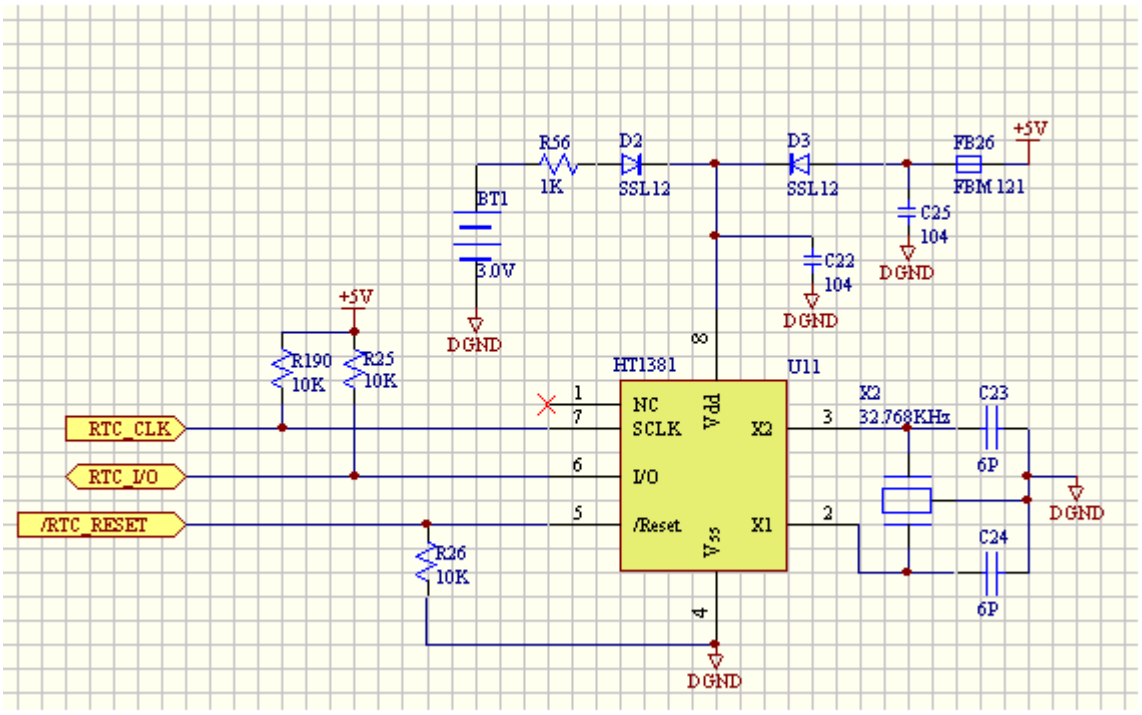
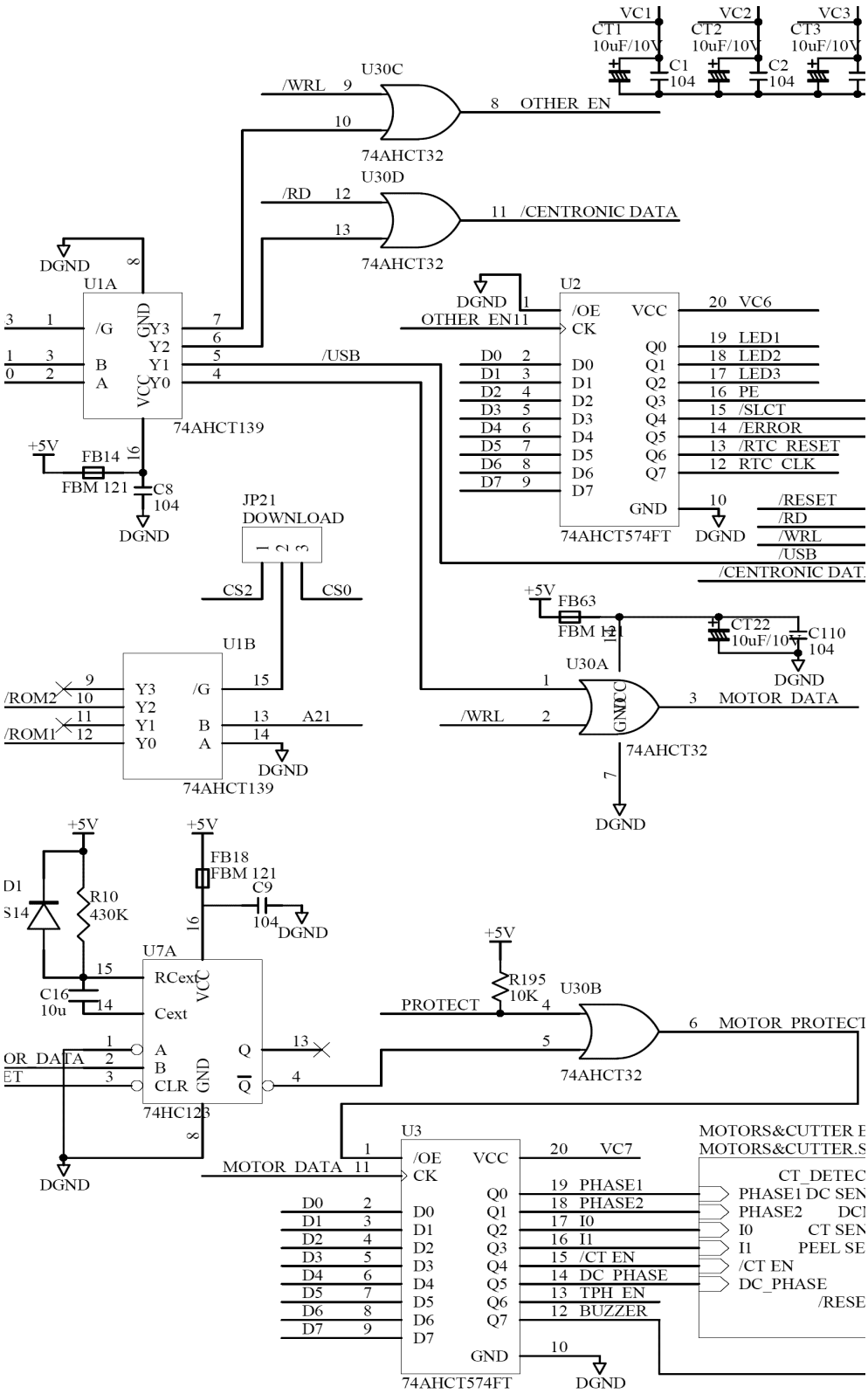


Fig. 3.6 Real-Time Clock Circuit

HT1381 is serial time Keeper.

3.7 Decode Circuit



CS0: (0000 0000 ~ 003F FFFF)
CS1: (0040 0000 ~ 007F FFFF)
CS2: (0080 0000 ~ 00BF FFFF)
CS3: (00C0 0000 ~ 0FFF FFFF)

ROM1: (0000 0000 ~ 001F FFFF)
ROM2: (0020 0000 ~ 003F FFFF)
Memory card :(0040 0000~007F FFFF)
Download ROM: (0800 0000 ~ 09F FFFF)
DRAM: (0100 0000~011F~FFFF)
Other Map

Address	Bit	Function		
00C0 0000 MOTOR DATA	0	PHASE1		
	1	PHASE2		
	2	I0		
	3	I1		
	4	/CT EN		
	5	DC PHASE		
	6	TPH EN		
	7	BUZZER		
00D0 0000 /USB	0	USB_D0		
	1	USB_D1		
	2	USB_D2		
	3	USB_D3		
	4	USB_D4		
	5	USB_D5		
	6	USB_D6		
	7	USB_D7		
00E0 0000 /CENTRONIC DATA	0	P_D0		
	1	P_D1		
	2	P_D2		
	3	P_D3		
	4	P_D4		
	5	P_D5		
	6	P_D6		
	7	P_D7		
00F0 0000 OTHER ENABLE	0	LED1		
	1	LED2		
	2	LED3		
	3	PE		
	4	/SLCT		
	5	/ERROR		
	6	/RTC RESET		
	7	RTC CLK		

3.8 Thermal Head Drive/ Protection and History Control Circuit

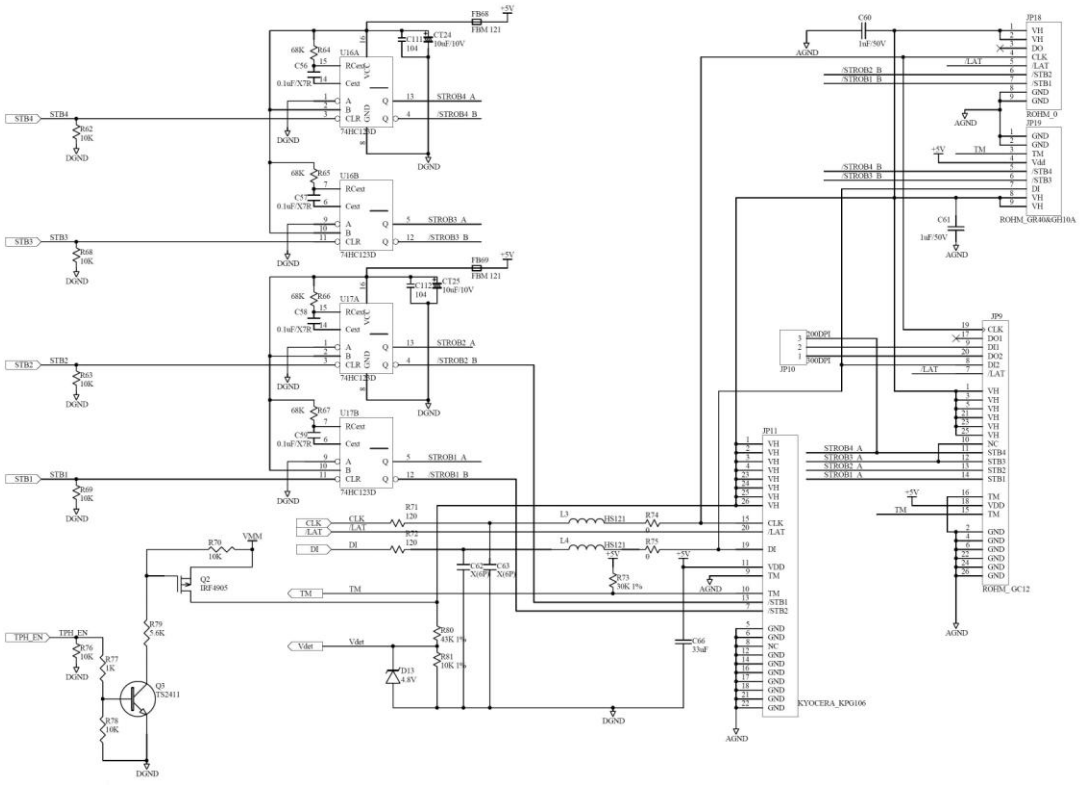


Fig. 3.9 Thermal Head Drive/ Protection and History Control Circuit

This is the thermal head drive circuit. CLK and /LAT connected to thermal head control clock and data latch respectively. TPH_EN controls the DC24V voltage of the thermal head. When TPH_EN is “LOW”, the thermal head will be separated from 24V (V_{MM}). STB1-STB4 determines whether to heat the thermal head or not. DI sends the printer data to the print head. TM is the temperature for thermal head. Vdet feeds back the voltage and compensates the heat time for voltage accuracy when printing.

3.9 24V/5V Converter Circuit

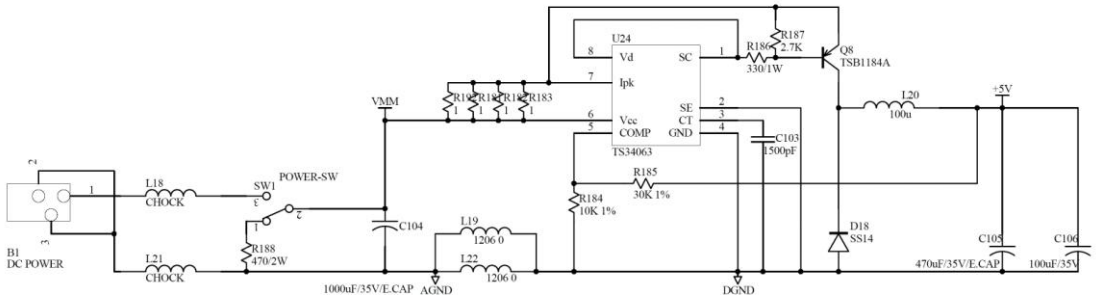


Fig. 3.10 24V/5V Converter Circuit

Figure 3.9 is the DC-TO-DC (DC24V to DC 5V) converter circuit, which is a step-down system circuit structure. U24 is the DC-TO-DC converter IC, which can convert voltage by using PWM control mode. The output voltage is dependent on R3 and R4.

3.10 Stepping Motor And DC Motor Driver/ Protection Circuit

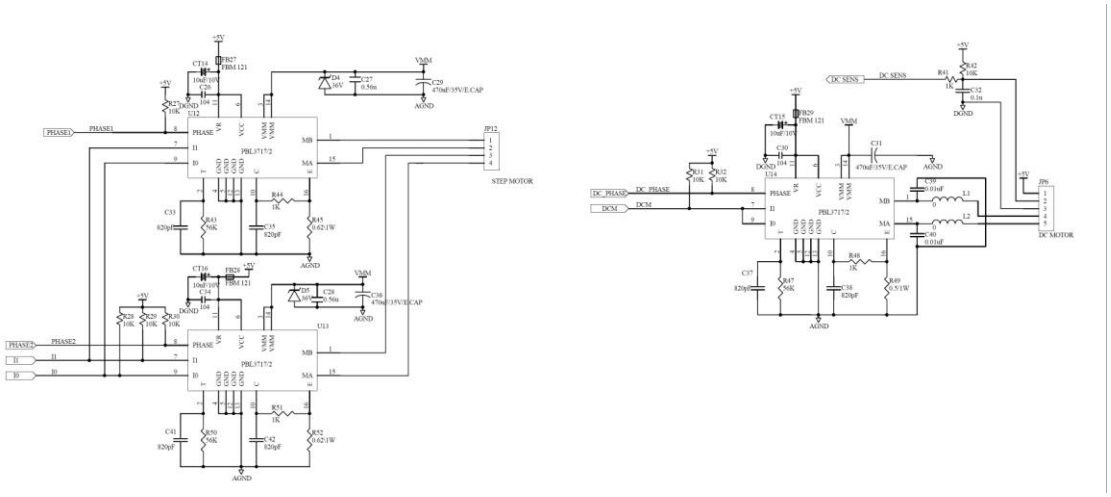


Fig. 3.10 Stepping Motor And DC Motor Driver/ Protection Circuit

This is the Stepping Motor Drive. Connector JP12 sends the pattern as shown in table1. The status of I0 & I1 determines the stepping motor power level, the power level pattern is shown in table2. PHASE1 and PHASE2 determine the pattern of stepping motor drive circuit. For example, the sequence of PHASE1/PHASE2 in full step mode is 0/0 → 0/1 → 1/1 → 1/0.

Pin on JP12 / Step	1	2	3	4	PHASE
1	ON	ON		ON	A
2		ON	ON		/A
3	ON		ON	ON	/B
4		ON	ON		B

Table1 Stepping Motor Pattern

MOTOR CURRENT		I0	I1
HIGH LEVEL	100%	L	L
MEDIUM LEVEL	60%	H	L
LOW LEVEL	20%	L	H
ZERO CURRENT	0%	H	H

Table2 Stepping motor power pattern

The power of DC motor is on when DCM pin is at 'LOW' level. DC-PHASE determines the DC motor run direction (forward or backward).

3.11 Communication (Serial & Parallel Port) Circuit

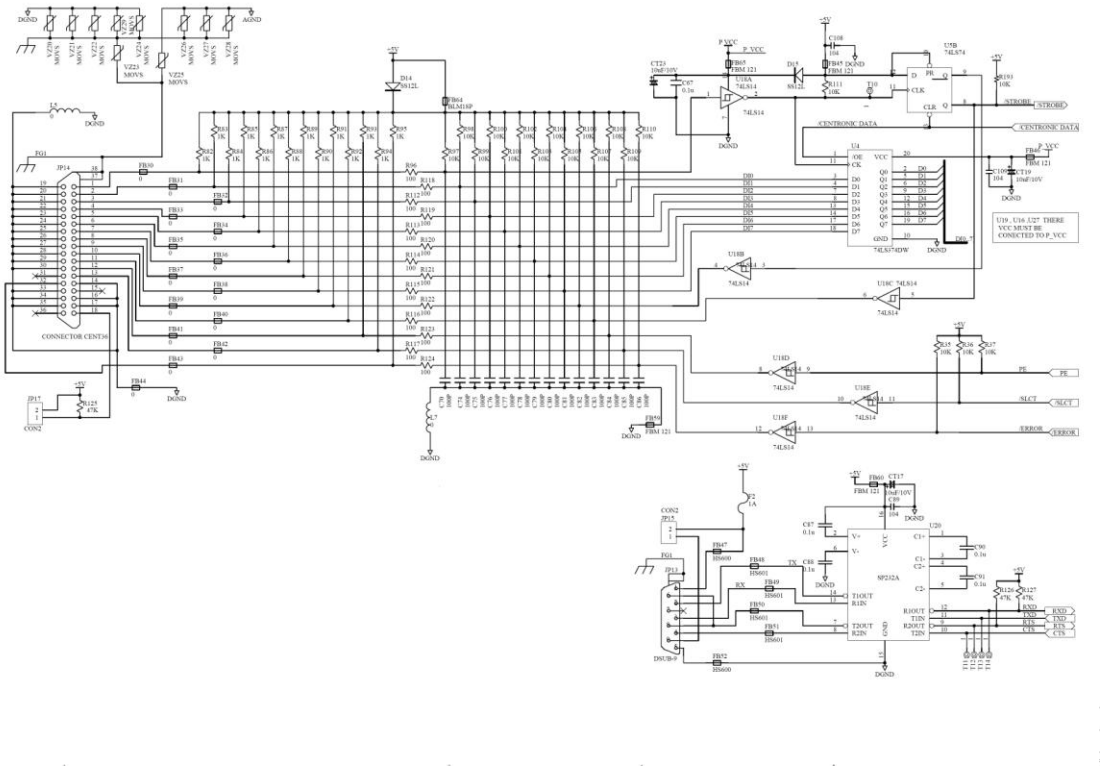


Fig. 3.11 Parallel port and RS-232 Circuit

The RS-232 Circuit is for use with the externally connected personal computer and keyboard unit. JP13 connects to PC serial port through the RS-232 cable. RxD is the data receive pin of MCU. CTS is the Clear To Send of MCU, which sends the signal from the external device. TxD is the data output pin of MCU. RTS is the Request To Send signal which MCU sends to the external device.

The parallel port circuit is for use with the externally connected personal computer parallel port through the printer cable. When PC's strobe signal comes in, the printer responds the 'busy status' until it reads the data from parallel port. Printer will respond the 'error signal' to PC when it is in error status.

3.12 Cutter Drive Circuit

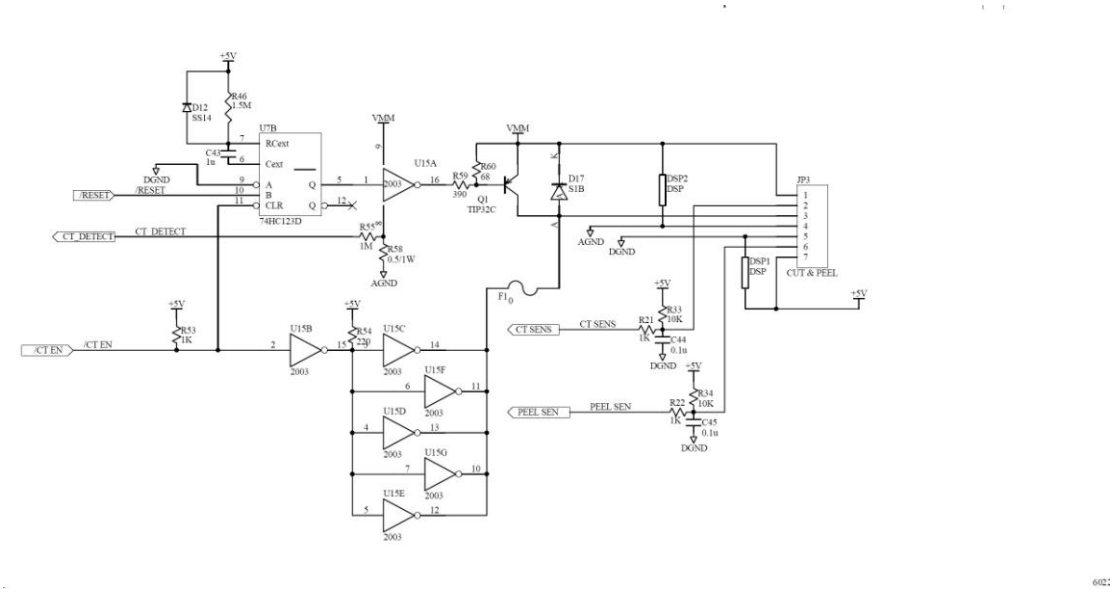
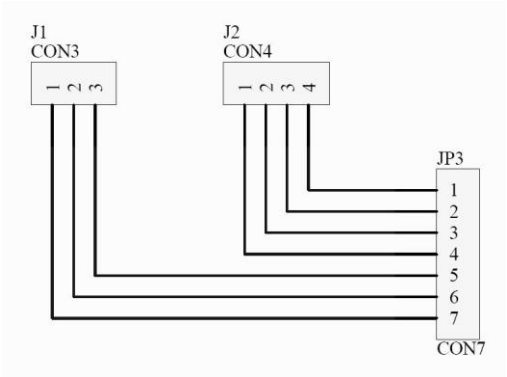


Fig. 3.12 Cutter Drive Circuit

This is the cutter drive circuit. The RESET signal is 1 when the printer is turned on. /CT_EN controls the activation of the cutter. The cutter is activated when CUTTER signal is “low”. The sensor of cutter sends the “Hi-Lo” signal to MCU through CT_SENS that detects the action of cutter.

3.13 Cutter & Peel Translate Board



Cutter and peel connector circuit.
JP1 connect to peel module.
JP2 connect to cutter module.
JP3 connect to main board JP3.

3.14 Mainboard Replacement

1. Turn off the printer power.
2. Remove the power cord and RS-232 and/or parallel port cable.
3. Open the top cover of the printer.
4. Remove the printer front panel.

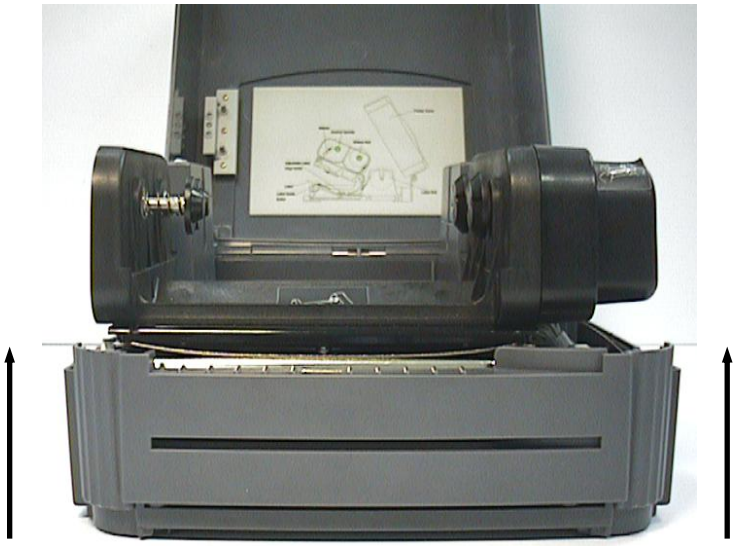


Fig. 3.14 Remove the front cover in the direction of the arrows

5. Remove the two screws and the metal cover.

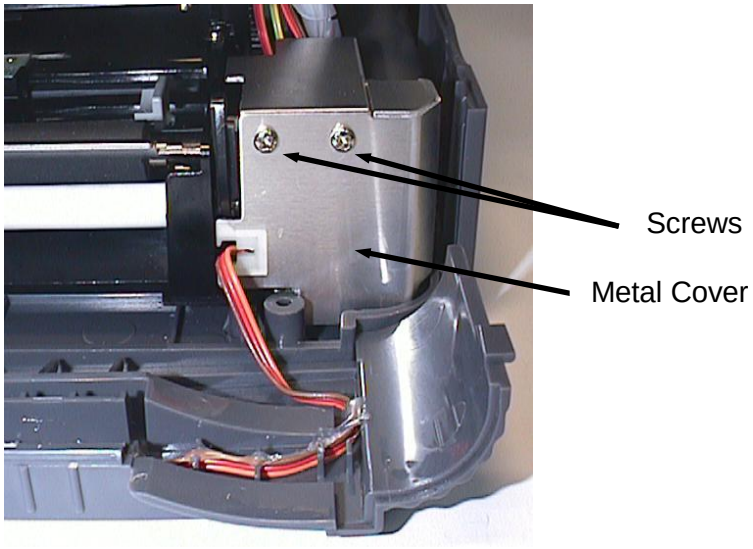


Fig. 3.15 Remove the screws and metal cover

6. Release the cable tie and remove the peel-off sensor connector.

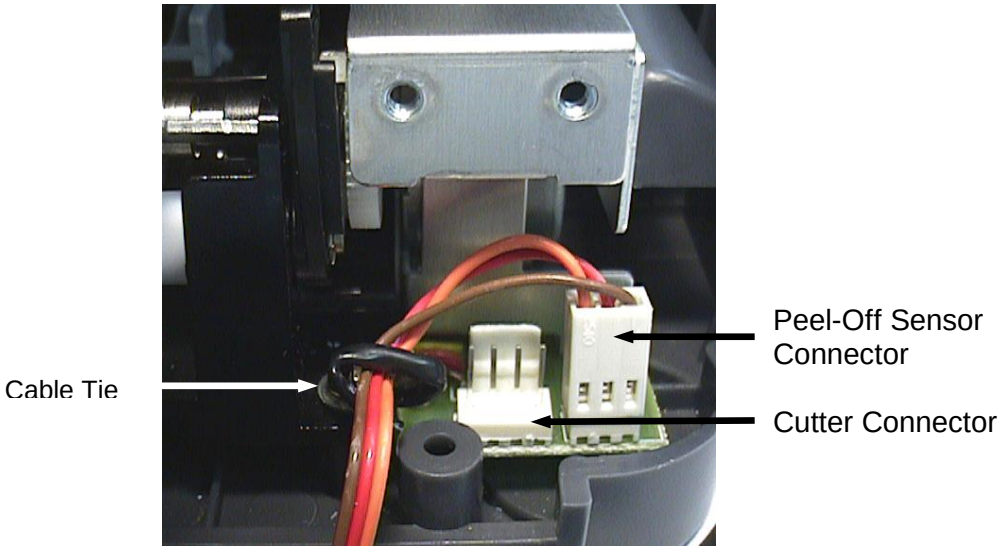


Fig. 3.16 Cable tie and peel-off sensor connector

7. Remove the screws on the lower left and lower right corners of main mechanism.

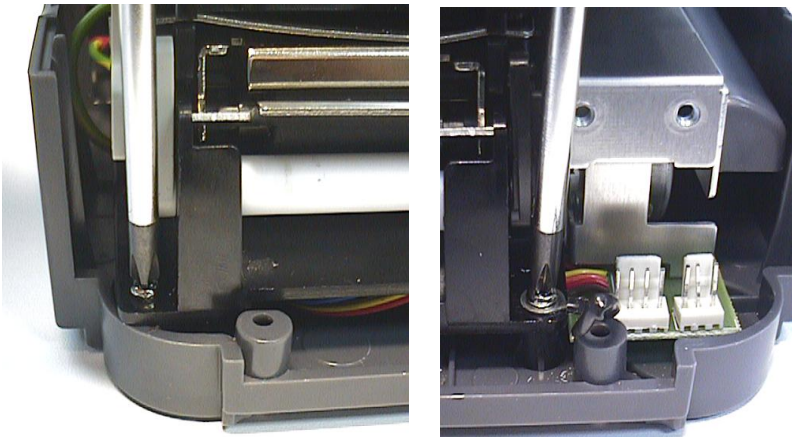


Fig. 3.17 Remove the screws in the lower left, lower right corners of the main mechanism.

8. Remove the four screws of the internal label roll mount.

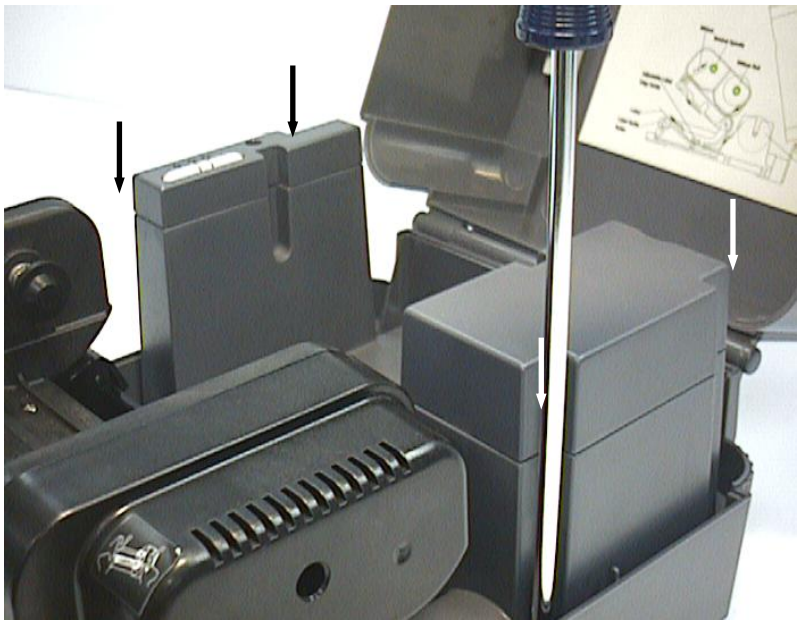


Fig. 3.18 Remove screws of the label roll mount

9. Move the mechanism about 5 mm in the label feed direction.
10. Take out the internal label roll mount and remove the connector.

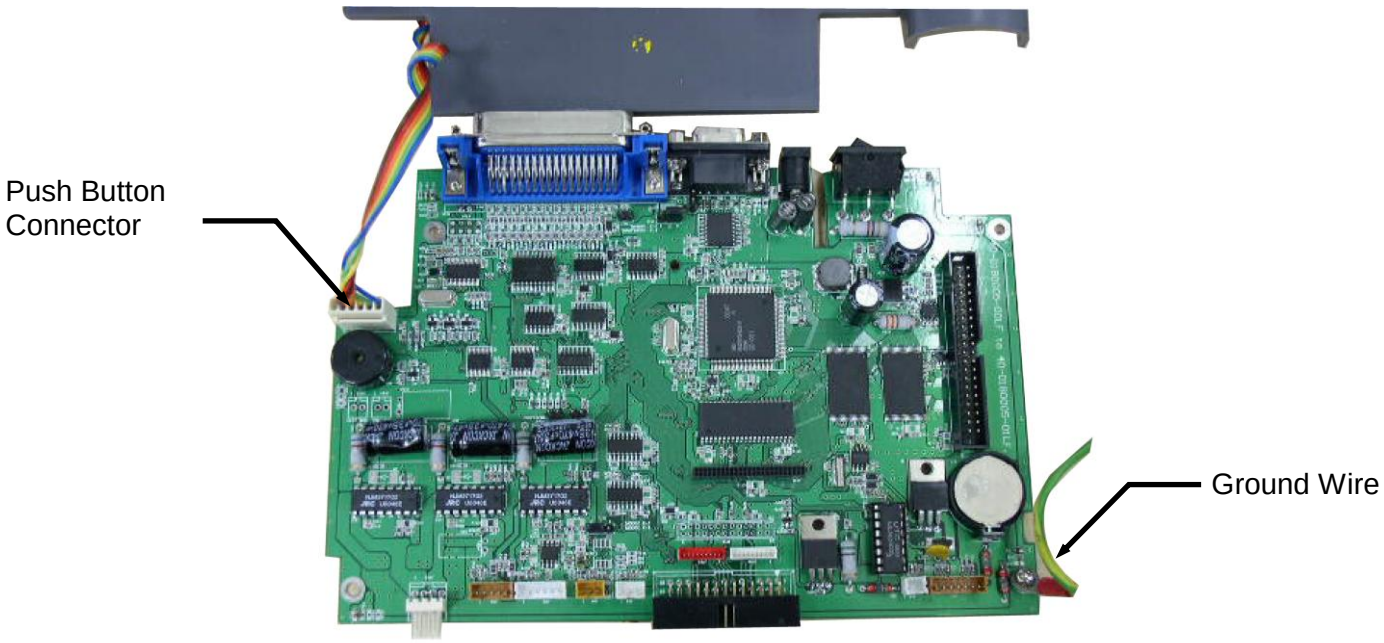


Fig. 3.19 Take out the internal label roll mount and remove the connector

11. Remove the screw of ground wire on the mainboard.
12. Remove all connectors on the mainboard. (JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP11, JP7, JP9, JP12)

Connector	Description
JP1	External button, LED connector
JP2	Ribbon sensor receiver connector
JP3	Cutter and Peel off sensor connector
JP4	Black mark sensor connector
JP5	Gap / ribbon transmit sensor connector
JP6	DC motor and encoder connector
JP7	TPH head up switch connector
JP8	Memory cartridge connector
JP9	TPH connector
JP12	Stepping motor connector

13. Take out the mechanism.
14. Remove the rest three screws on the mainboard.

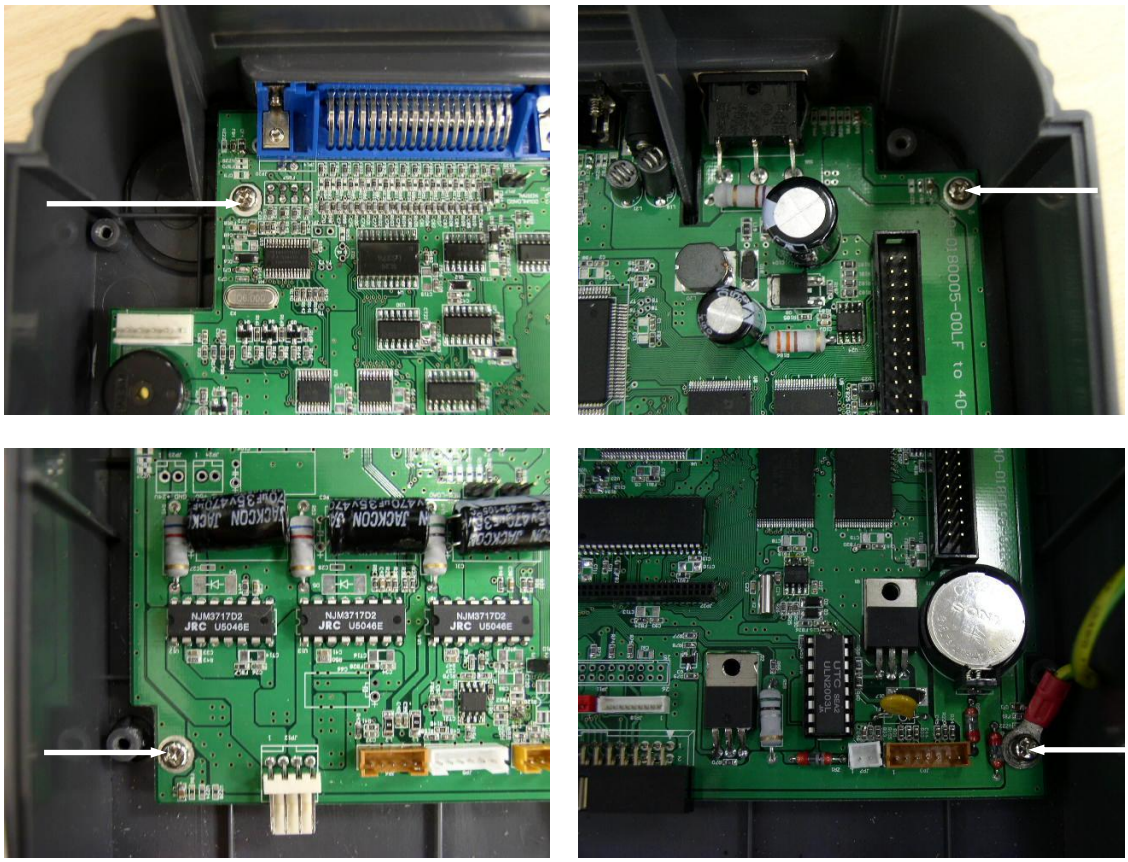


Fig. 3.20 Upper-Left, Upper-Right, Lower-Right Corner Screw

15. Replace the mainboard.
16. Reassemble the mechanism and internal label roll mount in the reverse procedures of the removal.

3.15 Cutter, DC Motor, Stepping Motor Driver IC Replacement

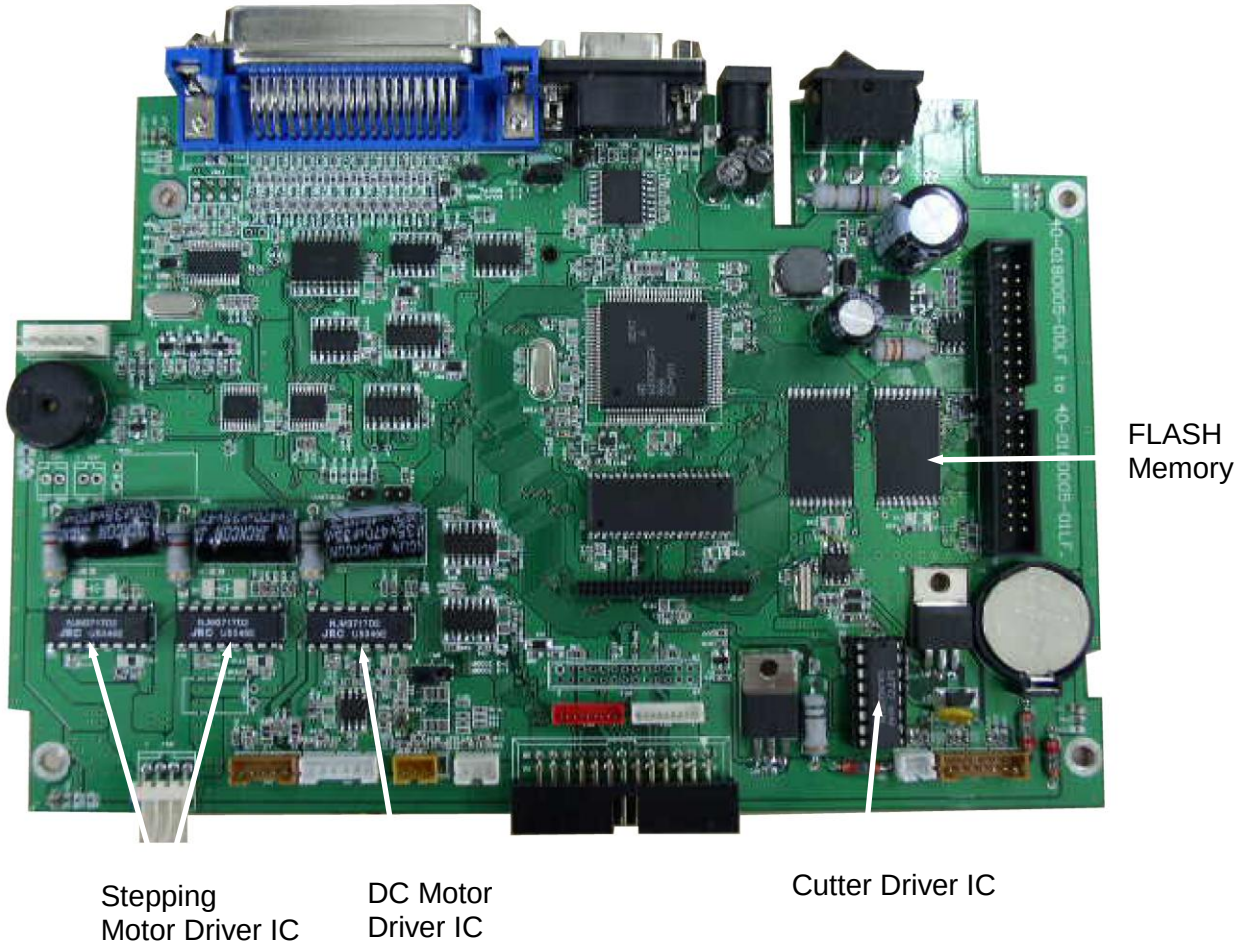


Fig. 3.22 Driver IC Locations

If the DC motor (ribbon rewind spindle) rotates back and forth, please check the DC motor driver IC, make sure it is firmly inserted in the IC socket and is not burned.
If the cutter does not work, please check that the software or program has been switched to the cutter mode. If the cutter still does not function, please check the cutter driver IC, make sure it is firmly inserted in the IC socket and is not burned.
The stepping motor driver IC is burned if the stepping motor makes noises but does not feed labels when the FEED key is pressed. In this case, please replace with a new driver IC.
Use an IC clamp to remove the damaged IC.

4. MECHANISM

4.1 Cutter Installation

1. Turn off the printer power.
2. Open the top cover of the printer.
3. Remove the printer front panel slowly and carefully. (Cf. Fig. 3.14)
4. Remove the two screws and the metal cover. (Cf. Fig. 3.15)
5. Release the cable tie and remove the peel-off sensor connector. (Cf. Fig. 3.16)
6. Remove the peel-off sensor connector.
7. Plug in the cutter connector.
8. Insert the right and left side flange of cutter into the slot.

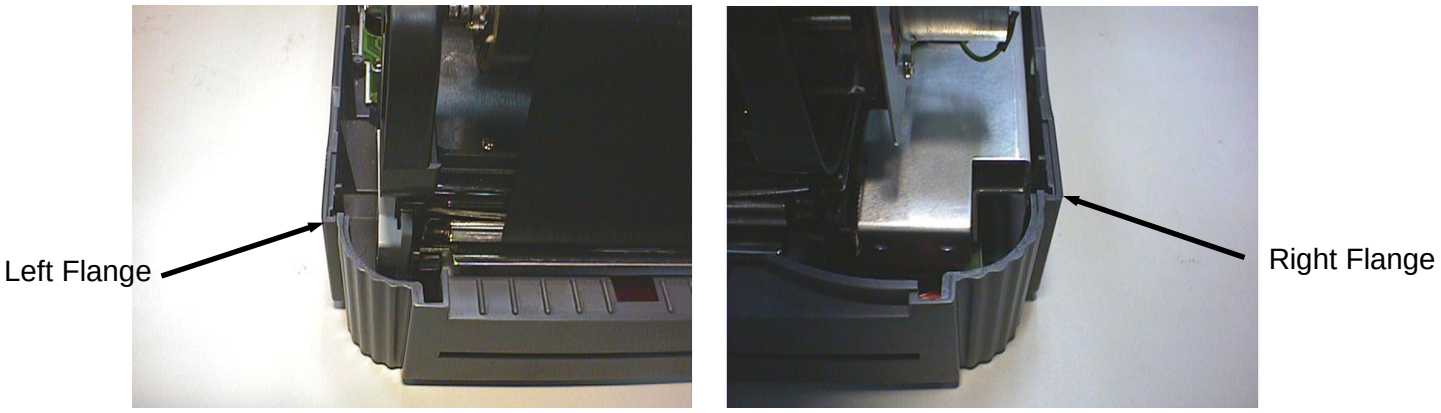


Fig. 4.1 Cutter Installation

9. Fasten the cutter from the bottom of the printer with the provided screw.
10. Make sure no screws or other parts are left in the printer.
11. Reassemble the mechanism and internal label roll mount in the reverse procedures of the removal.

4.2 Print Head Replacement

1. Turn off the printer power.
2. Remove the RS-232 cable and power cord.
3. Open the top cover.
4. Remove the ribbon and label roll.
5. Open the print carriage.
6. Remove the screw at the top front center of the mechanism, as shown.

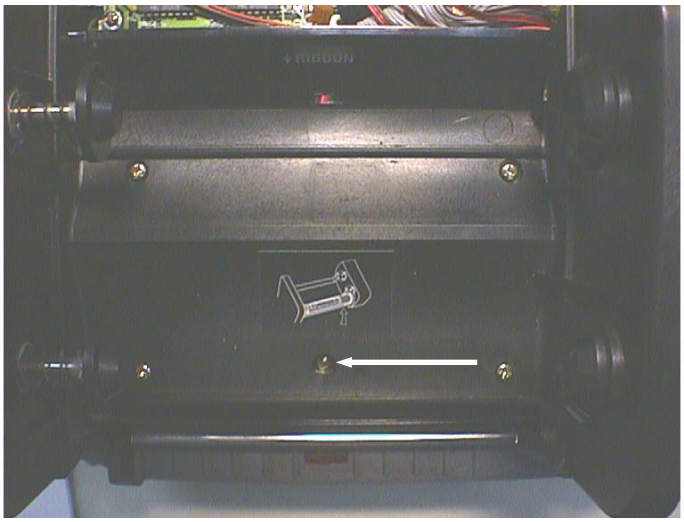


Fig. 4.2 The Print Head Screw

7. Disconnect the print head cable.

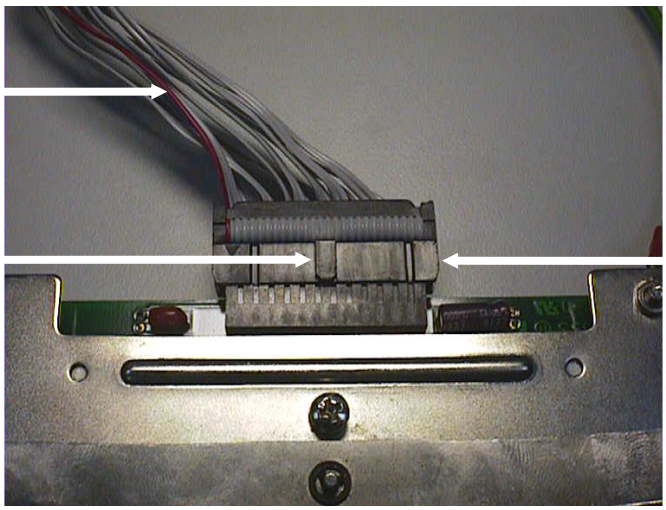


Fig. 4.3 Printhead and the Cable

Note: The key of connector must be positioned upward.
Do not touch the elements of the print head.
Do not disassemble the print head.

8. Tidy up the cable so that it does not protrude or interfere with the ribbon.
9. Reassemble the removed parts in the reverse order of removal.

4.3 DC Motor Replacement

1. Turn off the printer power.
2. Remove the power cord and RS-232 and/or parallel port cable.
3. Open the top cover of the printer.
4. Remove the printer front panel. (Cf. Fig. 3.14)
5. Remove the two screws and the metal cover. (Cf. Fig. 3.15)
6. Release the cable tie and remove the peel-off sensor connector. (Cf. Fig. 3.16)
7. Remove the screw on the PCB of peel-off and cutter connector.
8. Remove the screws in the lower left, lower right corners of the main mechanism. (Cf. Fig. 3.17)
9. Remove all four screws of the internal label roll mount. (Cf. Fig. 3.18)
10. Move the mechanism in the label feed direction about 5 mm.
11. Take out the internal label roll mount and remove connector JP1. (Cf. Fig. 3.19)
12. Remove the screw of ground wire on the mainboard.
13. Remove all connectors on the mainboard.
14. Take out the mechanism.
15. Remove the cable tie.
16. Remove the three screws on DC motor fixture.

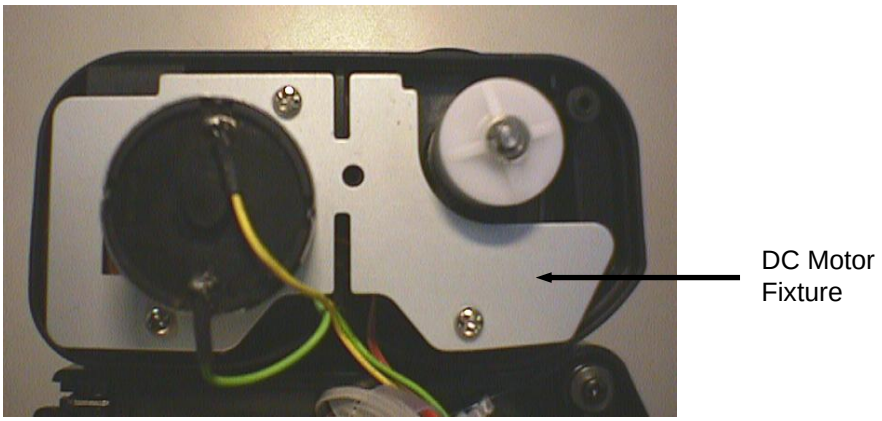


Fig. 4.4 DC Motor Fixture

17. Remove the two screws used to fix DC motor on the fixture.
18. Replace the DC motor and pull out the cables in connector No. 6.

    Note: The colors of DC motor wires in connector No. 6 are yellow (outside) and green (inside).

19. Reassemble the removed parts in the reverse order of the removal.

4.4 Ribbon Rewind Spindle Encoder Replacement

The encoder is installed on the gear box of DC motor, and is used to detect if the ribbon is unerringly rewound by the spindle. The encoder is connected to JP6 on the mainboard. Please switch the printer to thermal transfer mode. The multi-meter is used

to measure the voltage of Pin2 (+5V). If the voltage changes continuously from 0 to 5 volts DC, the encoder is in condition. Otherwise, please follow the steps below to replace the encoder PCB

1. Follow directions in Section 4.3 to remove DC motor and DC motor fixture.

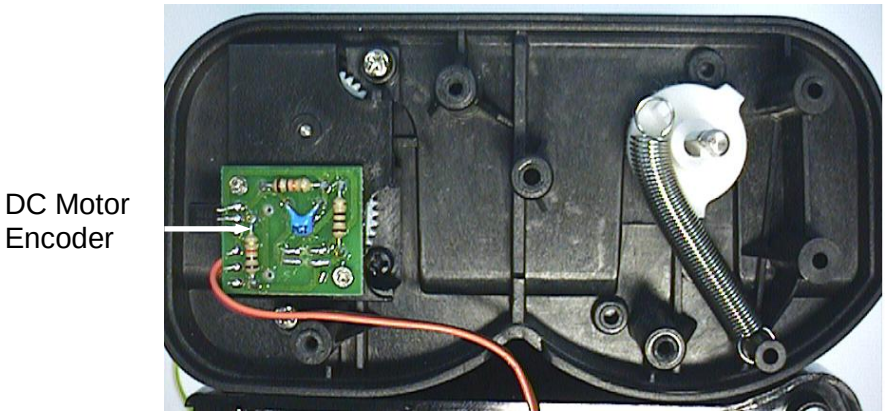


Fig. 4.5 DC Motor Encoder

2. Remove the two flat tap screws and cable tie.
3. Replace the Encoder PCB.
4. Reassemble the removed parts in the reverse order of removal.

4.5 Felt Fabric Replacement

Felt Fabric is located in the ribbon supply spindle. It is used to tighten the ribbon to prevent it from getting wrinkled during printing. If the ribbon can not be tightened when label back feeds during printing, please replace with a new felt to secure the best printing quality. Follow the steps below to replace the felt fabric.

1. Follow the instructions in Section 4.3 to remove DC motor and DC motor fixture.
2. Remove the E-ring and washer on ribbon supply spindle.

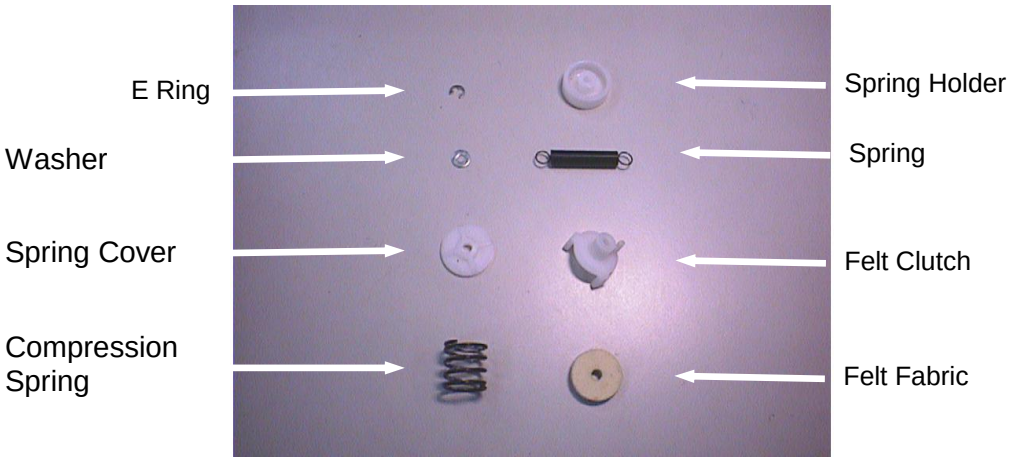


Fig. 4.6 Components of the Ribbon Supply Spindle

3. Remove the spring cover, compression spring and spring holder.
4. Remove the spring, felt clutch and felt fabric.
5. Replace with a new felt.

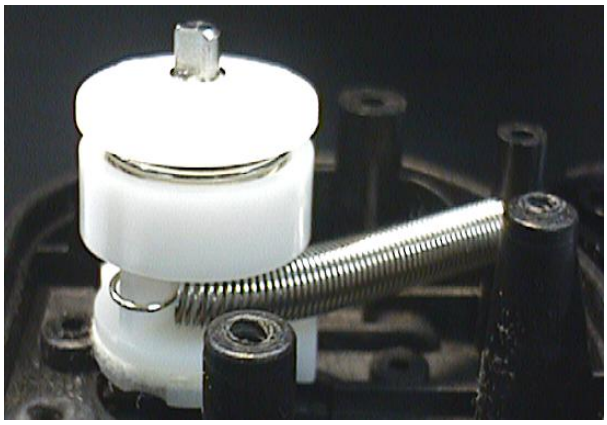


Fig. 4.7 Side View of the Ribbon Supply Spindle Assembly

6. Reassemble the removed parts in the reverse order of removal.

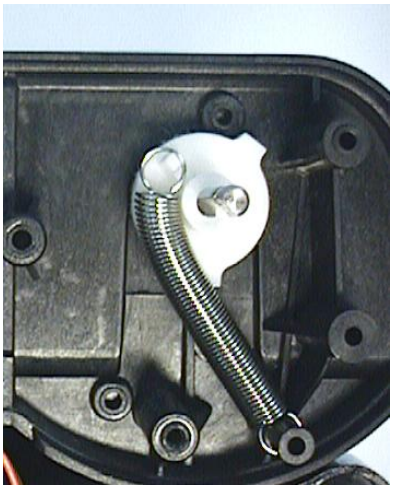


Fig. 4.8 Front View of the Ribbon Supply Spindle

4.6 Stepping Motor Replacement

1. Turn off the printer power.
2. Remove the power cord and RS-232 and/or Parallel port cable.
3. Open the top cover of the printer.
4. Remove the printer front panel. (Cf. Fig. 3.14)
5. Remove the two screws and the metal cover. (Cf. Fig. 3.15)
6. Release the cable tie and remove the peel-off sensor connector. (Cf. Fig. 3.16)
7. Remove the screw on the PCB of peel-off and cutter connector.
8. Remove the screws in the lower left, lower right corners of the main mechanism. (Cf. Fig. 3.17)
9. Remove all four screws of the internal label roll mount. (Cf. Fig. 3.18)
10. Move the mechanism in the label feed direction about 5 mm.
11. Take out the internal label roll mount and remove the connector. (Cf. Fig. 3.19)
12. Remove the screw of ground wire on the mainboard.
13. Remove all the connectors on mainboard. (JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP11, JP7, JP9, JP12)
14. Take out the mechanism.
15. Remove the rest three screws on the mainboard.
16. Remove the two screws of the stepping motor.

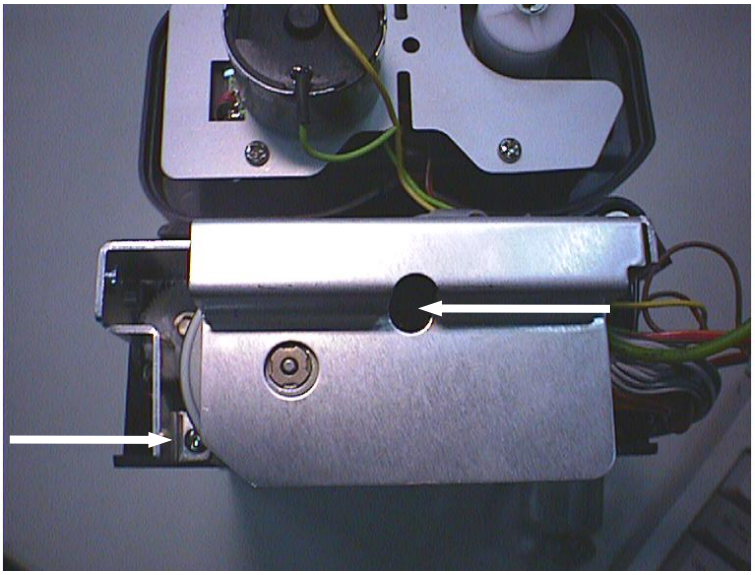


Fig. 4.9 Stepping Motor

17. Replace the stepping motor and reassemble the removed parts in the reverse order of removal.

4.7 Black Mark Sensor / Gap Sensor (Receiver) Replacement

Black mark sensor is reflection type sensor. It is connected to JP4 (3 pin connector). A multi-meter is used to measure the signal of Pin2 to see if there is voltage variation when black mark is detected. Before conducting the test, please issue the BLINE command first. The printer will switch from gap sensor to black mark sensor. If there is no voltage variation, please follow steps below to replace the black mark sensor / gap sensor (receiver) PCB.

1. Turn off the printer power.
2. Remove the power cord and RS-232 and/or parallel port cable.
3. Open the top cover of the printer.
4. Remove the printer front panel. (Cf. Fig. 3.14)
5. Remove the two screws and the metal cover. (Cf. Fig. 3.15)
6. Release the cable tie and remove the peel-off sensor connector. (Cf. Fig. 3.16)
7. Remove the screw on the PCB of peel-off and cutter connector.
8. Remove the screws in the lower left, lower right corners of the main mechanism. (Cf. Fig. 3.17)
9. Remove all four screws of the internal label roll mount. (Cf. Fig. 3.18)
10. Move the mechanism in the label feed direction about 5 mm.
11. Take out the internal label roll mount and remove the connector. (Cf. Fig. 3.19)
12. Remove the screw of ground wire on the mainboard.
13. Remove all the connectors on mainboard. (JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP11, JP7, JP9, JP12)
14. Take out the mechanism.
15. Remove one flat tap screws and black mark sensor PCB.

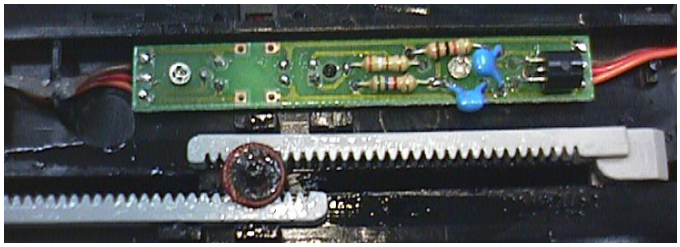


Fig. 4.10 Black Mark Sensor and Gap Receiver Sensor

16. Reassemble the removed parts in the reverse order of removal.

4.8 Ribbon Sensor (Receiver) Replacement

1. Turn off the printer power.
2. Remove the power cord and RS-232 and/or parallel port cable.
3. Open the top cover of the printer.
4. Remove the printer front panel. (Cf. Fig. 3.14)

5. Remove the two screws and the metal cover. (Cf. Fig. 3.15)
6. Release the cable tie and remove the peel-off sensor connector. (Cf. Fig. 3.16)
7. Remove the screw on the PCB of peel-off and cutter connector.
8. Remove the screws in the lower left, lower right corners of the main mechanism. (Cf. Fig. 3.17)
9. Remove all four screws of the internal label roll mount. (Cf. Fig. 3.18)
10. Move the mechanism in the label feed direction about 5 mm.
11. Take out the internal label roll mount and remove the connector. (Cf. Fig. 3.19)
12. Remove the screw of ground wire on the mainboard.
13. Remove all the connectors on mainboard. (JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP11, JP7, JP9, JP12)
14. Take out the mechanism.
15. Remove the screws, springs and spring bushing on both sides of the mechanism.

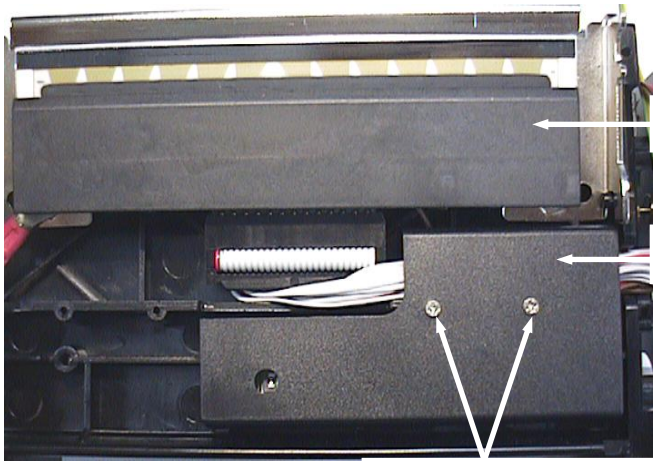


Fig. 4.11 Ribbon Sensor Cover

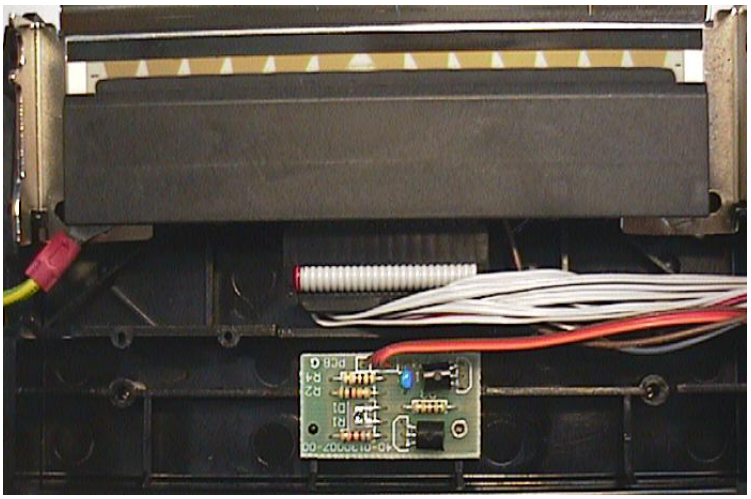


Fig. 4.12 Ribbon Sensor

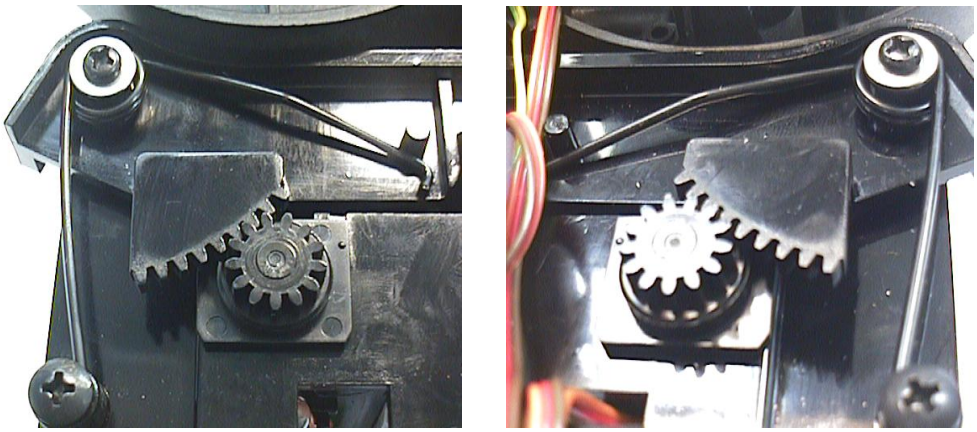


Fig. 4.13 Spring Installation on Left Side and Right Side

Note: The left side spring and the right side spring are different in shape. The right side spring has a straight end, when the left side spring has an end that is curved 90 degrees.

16. The main mechanism is divided into upper mechanism and lower mechanism.
17. The ribbon sensor (receiver) is located in the upper mechanism.
18. Remove the screws on the ribbon sensor cover.
19. Replace with a new ribbon sensor PCB.
20. Reassemble the removed parts in the reverse order of removal.

4.9 Ribbon Sensor (Transmitter) / Gap Sensor (Transmitter) Replacement

1. Please follow the steps in Section 4.6 to separate the upper mechanism from the lower mechanism.
2. The ribbon sensor (transmitter) is located in the center of the lower mechanism.

Fig. 4.14 Ribbon Sensor (Transmitter)

3. Remove the two flat tap screws
4. Remove the cable tie and sensor PCB.
5. Replace with a new PCB. Reassemble the removed parts in the reverse order of removal.

4.10 Platen Replacement

1. Turn off the printer power.
2. Remove the power cord and RS-232 and/or parallel port cable.
3. Open the top cover of the printer.
4. Remove the printer front panel. (Cf. Fig. 3.4)
5. Remove the two screws and the metal cover. (Cf. Fig. 3.15)
6. Release the cable tie and remove the peel-off sensor connector. (Cf. Fig. 3.16)
7. Remove the screw on the PCB of peel-off and cutter connector.
8. Remove the screws in the lower left, lower right corners of the main mechanism. (Cf. Fig. 3.17)
9. Remove all four screws of the internal label roll mount. (Cf. Fig. 3.18)
10. Move the mechanism in the label feed direction about 5 mm.
11. Take out the internal label roll mount and remove the connector. (Cf. Fig. 3.19)
12. Remove the screw of ground wire on the mainboard.
13. Remove all the connectors on the mainboard. (JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP11, JP7, JP9, JP12)
14. Take out the mechanism.
15. Remove the two screws, stepping motor and stepping motor cover. (Cf. Fig. 4.9)
16. Remove the E ring and two gears.

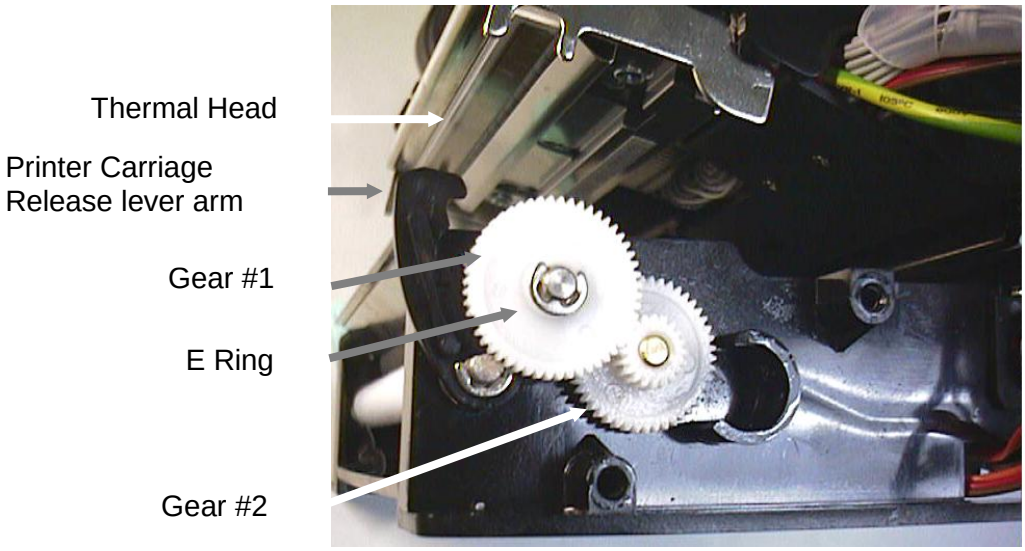


Fig. 4.15 Location of E ring and Gears

17. Remove the E ring and the printer carriage release lever on the left side of the mechanism.
18. Remove the E ring and the printer carriage release lever arm. (Fig. 4.15)

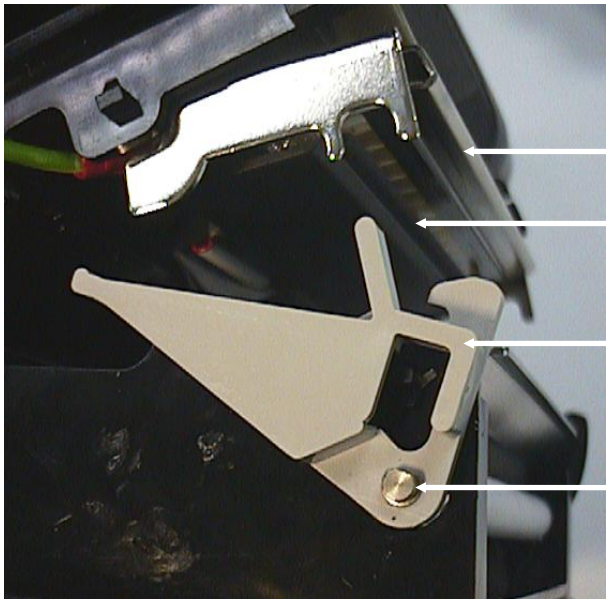


Fig. 4.16 Printer carriage release lever and E ring

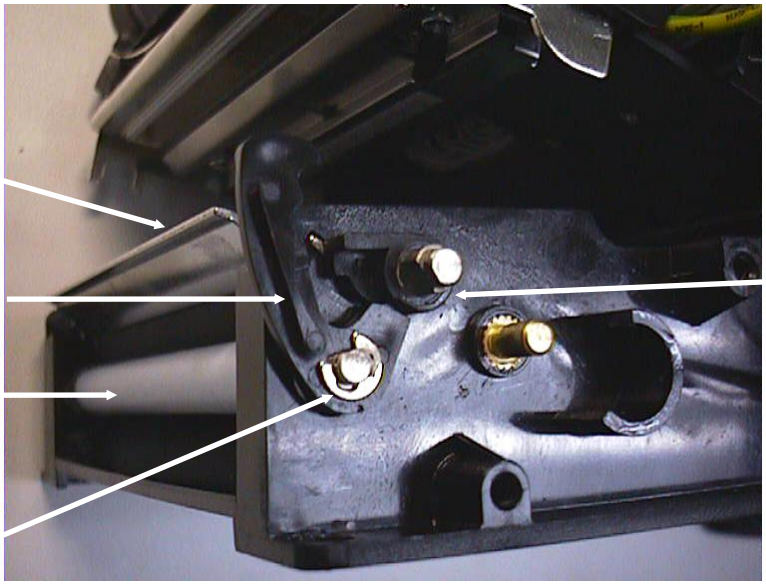


Fig. 4.17 Printer carriage release lever arm and E ring

19. Remove the teflon tube and stripper rod. (Fig. 4.18)
20. Remove the E ring, the right side and left side platen bushes. (Fig. 4.19)
21. Remove the stripper bar. (Fig. 4.17)

Fig. 4.18 Teflon tube and stripper rod

Fig. 4.19 Remove E ring and platen bush

22. Move the platen to the right of the mechanism.
23. Replace the platen and reassemble the removed parts in the reverse order of removal.

5. TROUBLE SHOOTING

5.1 Error Messages

Syntax Error:
The command format is incorrect. Check user's manual to be sure.
The serial port setting is incorrect. Check DIP switch and reset the printer.

Out of Range:
Numeric input is too large to be processed.
The input string is too long to be stored.
The size of the text of bar code exceeds that of the label.

Download Error:
The format of the downloaded file is incorrect.
There is not enough memory to store the file.

Stack Overflow:
Program contains too complex mathematical expressions. Divide into several expressions.
There is too much nested routine.

Memory Error:
Too many variables defined.

RS-232 Error:
The serial port setting is incorrect.

File Not Found:
Cannot open the file specified. Download the file again.

Type Mismatch:
Variable type mismatch.

Gap Not Found:
Cannot detect label edge. Calibrate the backing paper again.

Clock Access Error:
Can not read from/write to the clock.

5.2 Trouble Shooting

Problems	Solutions
1. Ribbon does not advance.	Check the printing mode setting and reset the printer.
2. Poor print quality.	Clean the print head. Adjust the print density setting.
3. Only prints diagonal pattern in the self-test.	Ribbon and paper are incompatible. Use a different type of ribbon.
4. Power indicator light does not illuminate.	Check the connection of serial port cable.
5. On-line indicator light does not to illuminate.	Check the DIP switch setting and reset the printer. Check that power cord is properly connected.
6. Error indicator remains illuminated.	Out of paper or out of ribbon. Check the DIP switch setting Check the paper core, make sure it is installed on the ribbon rewind spindle. Press the FEED key. The error message will be printed out on the print media or sent out through RS-232 port. If there is no problem with direct thermal printing, but error occurs in thermal transfer printing. Please check the encoder of the DC motor.

5.3 Calibrate the Gap Register

Install the label.
Turn on the printer power while pressing the PAUSE button. The printer will calibrate the transparency of the backing paper and adjust the gap register.

5.4 Self-test

Install the label.
Turn on the printer power while pressing the FEED button, the printer will:
Print head checking pattern.
Calibrate the label length.
Print internal settings.
Initiate self-test.
Enter dump mode.

5.5 Ram Clear

Press the PAUSE and FEED button simultaneously for more than 3 seconds. The printer will clear the memory and reset the printer.
Be sure to calibrate the gap register with blank label before printing.

5.6 Diagnosis Operation Procedure

When the power is turned on without any button pressed, self diagnosis is performed automatically to test the available memory. If any error occurs during this period, the ERR light will flash.

Do the self test and inspect the test pattern to check if the thermal head is available.

5.7 Testing Sensors

A. Checking Ribbon Sensor

Switch the multimeter to the DC gear. Connect the black wire to DC GND, and the red wire to PIN2 of JP2.

1. When ribbon is detected between TX and RX of the ribbon sensor, the measured voltage should be 5 Vdc.
2. When ribbon is not detected between TX and RX of the ribbon sensor, the measured voltage should be 0 Vdc.

The ribbon sensor is normal if the checking complies with the two cases above. Or else, the ribbon sensor is out of order.

B. Checking DC Motor Encoder Sensor

Switch the multimeter to the DC gear. Connect the black wire to DC GND, and the red wire to PIN2 of JP6.

1. When gap of the gear box is detected by the DC motor encoder sensor, the measured voltage should be 5 Vdc.
2. When gap of the gear box is not detected by the DC motor encoder sensor, the measured voltage should be 0 Vdc.

The DC motor encoder sensor is normal if the checking complies with the two cases above. Or else, the DC motor encoder sensor is out of order.

C. Checking Gap Sensor

Do gap calibration first by holding the Pause button and activating the printer power at the same time. If the calibration result is OK, go on and check the gap sensor. Switch the multimeter to the DC gear. Connect the black wire to DC GND, and the red wire to PIN2 of JP5. Load label on the printer.

1. When gap (backing paper only) is detected between TX and RX of the gap sensor, the measured voltage should be 0 Vdc.
2. When gap (backing paper only) is not detected between TX and RX of the gap sensor, the measured voltage should be 5 Vdc.

The gap sensor is normal if the checking complies with the two cases above. Or else, the gap sensor is out of order.

D. Checking Black Line Sensor

Switch the multimeter to the DC gear. Connect the black wire to DC GND, and the red wire to PIN2 of JP4. Load black line label on the printer.

1. When black line is detected by the black line sensor, the measured voltage should be 5 Vdc.
2. When black line is not detected by the black line sensor, the measured voltage should be 0 Vdc.

The black line sensor is normal if the checking complies with the two cases above. Or else, the black line sensor is out of order.

E. Checking Peel Off Sensor

Switch the multimeter to the DC gear. Connect the black wire to DC GND, and the red wire to PIN6 of JP3.

1. When label is detected by the peel off sensor, the measured voltage should be 0 Vdc.
2. When label is not detected by the peel off sensor, the measured voltage should be 5 Vdc.

The peel off sensor is normal if the checking complies with the two cases above. Or else, the peel off sensor is out of order.

5.8 Cleaning the Print Head

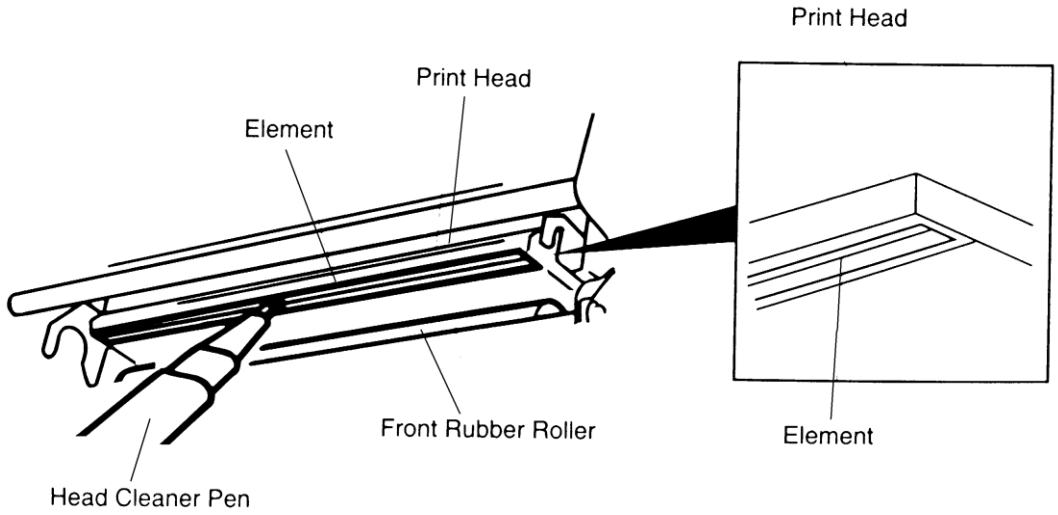
The printer should be cleaned regularly to retain high quality and optimum performance. The greater the usage of the printer, the more frequent the cleaning.

1. Always turn off the printer before cleaning the print head. Allow the printhead to cool for a minimum of one minute.
2. Open the printer cover.
3. Open the printer carriage by pulling up the release lever to the left of the front rubber roller.
4. Remove the ribbon and label.
5. Clean the print head element with a head cleaner pen or use a cotton swab and 100% ethanol to clean the print head surface.

Note:

*Do not touch printer head by hand. If you touch it careless, please use ethanol to clean it.

*It's industry alcohol. Please do not use regular alcohol, which may damage the printer head.



Update History

Date	Content	Editor
2006/4/12	1. Modify to RoHS version.	Camille
2006/6/26	1. Modify the 4-11 item 1-10 : Main board ass'y from 98-0180157-10LF/11LF/12LF to 98-0180157-20LF/21LF/22LF 2. Modify the 3-6 read-time clock circuit figure	Camille
2006/7/24	1.Modify the printer spec.	Camille
2006/8/2	1. Modify the 4-11 item 5-1 : Power adapter from 62-0010021-00LF to 62-0180002-00LF	Camille
2006/8/17	1. Modify the 4-11 item 1-10 : Main board ass'y from 98-0180157-20LF/21LF/22LF to 98-0180157-30LF/31LF/32LF	Camille
2006/8/28	1. Add the 4-11 item 5-5 : External Ethernet print server(Z) 2. Add Gap Sensor in the center part no..	Camille
2006/8/31	1. Modify the 4-11 item 4-2 : PCB-D ass'y from -00LF to -10LF	Camille
2007/1/3	1. Modify the 4-11 item 2-5 : Screw part no. from -31LF to -34LF 2. Modify the 4-11 item 1-12 : Screw part no. from -31LF to -34L	Camille
2007/1/15	1. Modify the 4-11 item 3-6 : Screw part no. from 37-1403015-32LF to 37-1403512-52LF 2. Add power cord/JP part no. 3. Add KP-200, Stand Alone Keyboard Display Unit part no.	Camille
2007/3/1	1. Modify the 4-11 item 1-10 : Main board ass'y from 98-0180157-30LF/31LF/32LF to 98-0180157-40LF/41LF/42LF	Camille
2007/3/9	1. Modify the 4-11 item 5-5 : External Ethernet print server(C) part no.	Camille
2007/4/14	1. Update TSC e-mail address. 2. Update 5.8 section:cleaning the print head.	Camille
2007/8/1	1. Company information update.	Camille
2007/11/8	1. Modify ribbon base assembly part no.	Camille
2007/12/7	1. Modify power supply and external Ethernet print server parts no./CEC	Camille
2007/12/20	1. Modify PCB-D Ass'y part no.	Camille
2008/1/10	1. Modify part number for label roller mount and memory module cover 2. Revoke part number for 98-1000017-00LF External Ethernet print server (Z)/US and 98-1000018-00LF External Ethernet print server (Z)/EU	Camille
2008/1/14	1. Modify description for 98-1000008-01LF External Ethernet print server (C)/US/CEC and 98-1000009-00LF External Ethernet print server (C)/EU	Camille
2008/3/18	1. Add lower cover ass'y (For parallel port) part no. 2. Modify label roller mount part no. from -20LF to -30LF 3. Add power adapter (62-0010021-02LF) /CEC for second source	Camille
2008/6/24	Remove the parts list section	Camille
2011/1/25	Modify TSC address	Camille

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